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ABSTRACT

The guide presents annotations for 191 references (1972-1982) dealing with computer technology for physically and developmentally handicapped persons. Citations are arranged alphabetically by author and include title, source, date, and a brief summary. A subject index follows the author index and lists references for topics such as communication, computer assisted instruction, disability/handicap, functional aids, institutes/schools/centers, microcomputers/applications, rehabilitation, service delivery, software, and teachers/service providers. A brief introductory section provides a model depicting the types of computer applications for the handicapped falling within the scope of education and rehabilitation. (CL)

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Introduction

Computer utilization for handicapped people has now come of age and the technological developments are far reaching. Just a few of the benefits now available include a microcomputer aided robotic arm which permits quadriplegics to feed themselves independently; computerized classroom management systems that enable teachers to tailor curriculum to individualized education plans; a talking wheelchair which helps nonvocal persons to communicate with others; computer assisted interactive video courseware to teach mentally retarded students; computer languages, such as LOGO, which stress exploratory learning for children with learning dysfunctions; computer programs for the immediate translation of written materials into braille; and a musically programmed Apple II connected to a vibrating platform allowing deaf people to feel the music and dance to the beat "heard" through their feet.

These and many other similar developments are so recent that unfortunately they remain largely unknown to administrators, teachers, service providers, and users. Goldenberg (1979) speaks to this dilemma by noting there is little reference to this technology for the handicapped in current textbooks. Furthermore, the field is so new that " . . . communication, even among the concerned professionals, still tends to be sluggish and spotty" (p. 6).

A literature awareness is one way for interested persons to become better acquainted with this newly emerging technology and herein lies the purpose of this Resource Guide. In essence, such an awareness can be a beginning for many who have yet to become familiar with and accept the challenge of the contributions that computer technology can make in improving the lives of physically and developmentally disabled individuals.

Many such contributions already exist which significantly improve the quality of both special education and rehabilitation services for the handicapped. In fact, Foulds (1982) is correct in stating that, "The recent explosion in the availability of personal microcomputers has perhaps no more important benefit than in special education and rehabilitation" (p. 155). A generic model representing some of these major areas of benefit is presented in Figure 1.

<table>
<tr><th></th><th colspan="3">Education</th><th colspan="3">Rehabilitation</th></tr>
<tr><th></th><th colspan="2">Instruction</th><th colspan="2">Management</th><th colspan="2">Functional Aids</th></tr>
<tr><th></th><th>Student/ Client</th><th>Teacher/Service Provider</th><th colspan="2"></th><th>Communication</th><th>Independent Living</th></tr>
<tr><td>Physical Disability</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Developmental Disability</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Figure 1

A Generic Model of Computer Applications
for the Handicapped

The model includes both physical and developmental handicaps on one dimension, and categorizes applications into education and rehabilitation along the other dimension. This framework is general and thus does not delineate the full range of fundamental computer usages. For example, Watts (1981) has identified 12 specific applications of microcomputers in education, and Vanderheiden (1981) speaks to the same number of uses in rehabilitation. The model, however, serves to introduce the reader to the major thrusts of work published in the area and included in the Guide. The subject index is intended to assist the reader in locating the literature which relates to the model domains.

In summary, Leneway and Montgomery (1981) indicate that "The lives of many handicapped persons have been vastly improved by computer technology . . . but millions wait to be served" (p. 49). If these yet to be impacted persons are also to share in the benefits it will be necessary for professionals in the fields of special education and rehabilitation to begin incorporating this expanding technology into their practice.

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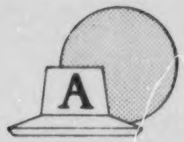
12. Bennett, R. E. Applications of microcomputer technology to special education. Exceptional Children, 1982, 49(2), p. 106.



001 Aeschleman, S.R., & Tawney, J.W. Interacting: A computer based telecommunications system for educating severely handicapped preschoolers in their homes. Educational Technology, 1978, 18(10), 30-35.

Reports on the testing of a computer system designed to educate preschool age handicapped children in their homes. The system is seen as a primitive forerunner of a model coordinated service delivery agency which would be heavily reliant upon the computer and telecommunications technology. The discussed components of this model agency are provision of services, coordinated service delivery, monitoring service delivery, and other research possibilities. The study established a telecommunications center linked with the homes of 18 subjects. Communication was conducted via a system of terminals and modems across telephone lines. Three computer driven learning stations were established in each home to teach motor and visual discrimination responses. Results of the study indicate that: (1) it is possible to conduct interactive automated instruction from a central site; (2) that the signal transmission is reliable; (3) parents can be taught to monitor the system and their child's performance; (4) severely retarded children will interact with the learning station apparatus; and (5) some subjects acquired complex discrimination as a result of using the system.

"The recent explosion in the availability of personal microcomputers has perhaps no more important benefit than in special education and rehabilitation." (Foulds, 1)

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002 Allard, K.E., & Thorkildsen, R.J. Intelligent videodisc for special education. Videodisc News, 1981, 2(4), 6-7.

Presents Intelligent Videodisc for Special Education Technology (IVSET), an interactive system designed and developed at Utah State University to provide instruction to mentally retarded persons. Components of the system are a DVA 7820 videodisc player, an Apple II computer with two disk drives, a light interrupt touch panel mounted on a Sony 12" color TV, an interface board, and a videoprocessor board. The system combines video and audio display and touch input. Four instructional packages have been developed for the system: (1) matching shapes, sizes, and colors; (2) time telling; (3) coin recognition; and (4) functional word recognition. Each of the packages have been field tested for quality evaluation and ease of implementation; however, no field test results are presented.

003 Apple Computer Clearinghouse for the Handicapped. Prentke Romich Company, RD.2, Box 191, Serene, Ohio, 44676.

This clearinghouse specializes in materials on microcomputers for handicapped individuals. A catalogue is available which summarizes software/courseware for the handicapped.

004 Arcanin, J. Computer-assisted instruction at the California School for the Deaf - past, present, and future: An administrator's view. American Annals of the Deaf, 1979, 124, 573-577.

Describes in four phases the origin and development of a computer assisted instruction (CAI) program at the California School for the Deaf at Berkeley (CSDB). During the initial phase (1970-73), the school participated in the CAI research and demonstration project which was managed by Dr. Suppes at the Institute for Mathematical Studies in Social Sciences at Stanford University. Phase II began in 1973 when the Stanford R&D project was completed which left CSDB faced with the problem of where to get computer services, courseware, and the personnel to continue a quality CAI program. A solution for continuation was found through a collaborative arrangement with administrators from the Lawrence Hall of Science of the University of California, Berkeley. A program was established which: (1) adapted current Lawrence Hall of Science computer programs for deaf children; (2) developed a functional directory of all computer programs and lessons; (3) provided teacher training to enhance teacher attitude toward CAI; and (4) increased student interest in CAI. Phase III (1978-present) began through a Title IV-C grant and enabled the program to greatly expand. For example, a microcomputer graphic system was incorporated and a regional center was established at the school. As a CAI Regional Center for the Deaf, CSDB currently: (1) provides hardware to its day school counterparts; (2) provides inservice training to its day school faculty; (3) coordinates new software development; (4) coordinates translation of current software; (5) coordinates dissemination of software; and (6) provides program evaluation. Phase IV is the future and the author views the horizon as challenging and bright.

005 Arcanin, J., & Zawolkow, G. Microcomputers in the service of students and teachers - Computer-assisted instruction at the California School for the Deaf: An update. American Annals of the Deaf, 1980, 125, 807-813.

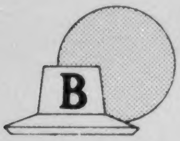
The California School for the Deaf, Berkeley (CSDB) has been involved in developing computer assisted instruction (CAI) work since 1970. In the 1979-1980 school year, CSDB began implementing a project to investigate the feasibility of a regional network of schools using CAI on microcomputers. Three hundred students from eight public and one private school within 60 miles of the San Francisco Bay area are participating in the project. Teachers are provided a short preservice introduction to the equipment and then a 2-day inservice workshop. They learn how to use existing CAI programs and how to "author" or write their own software. The different levels of software used at CSDB on the Apple II microcomputer is discussed. The authoring capabilities are considered to be the most powerful and functional software available for the teachers. The three basic parts of the authoring system (the author section, the student presentation section, and the record keeping and management section) are explained in some detail.

006 Ashcroft, S., & Young, M. Microcomputers for visually-impaired and multihandicapped persons. Journal of Special Education Technology, 1981, 4(1).

This is one of 17 papers in a special issue entitled, "Media Technology: Exploring Applications and Innovations for Severely Handicapped Students." The special issue is the proceedings of the fourth annual symposium on media technology.

007 Aylor, J.H., Johnson, B.W., & Ramey, R.L. The impact of microcomputers on devices to aid the handicapped. Computer, 1981, 14(1), 35-39.

Several computerized aids to assist physically handicapped persons which were developed at the University of Virginia Rehabilitation Engineering Center are discussed. They are classified into three categories: (1) aids for independent living; (2) aids for employment; and (3) aids for clinical evaluation and training. All aids mentioned use microprocessors because of the flexibility they offer. Independent living aids include powered wheelchairs, prostheses, manipulators, and environmental control systems. A computer printout transport mechanism to aid quadriplegics in computer programming is outlined. One application within clinical evaluation is appropriate wheelchair selection.



008 Baker, B. Minspeak. Byte, 1982, 7(9), 186-202.

Introduces a new language prosthesis designed for disabled persons who are physically unable to speak or use sign language. Minspeak is a semantic interface that consists of fewer than 50 keys which produce thousands of spoken sentences which can be activated by fewer than seven keystrokes. Minspeak has implemented a linguistic coding system in which the sequence of keystrokes defines the context of the message. Included in the article is information on the development of Minspeak, the way in which the system functions, a description of hardware components, and future plans to expand the system.

009 Ballenger, W.L. A computer assisted instruction system for the blind and visually impaired. Paper presented at the National Educational Computing Conference. Iowa City: University of Iowa, June 1979. (ERIC Document Reproduction Service No. ED 178 068.)

The purpose of this project was to develop a computer based instruction system which would supplement vocational rehabilitation programs for the blind and visually impaired. Several media alternatives exist for output of computerized instructional material for persons without normal vision. They are large terminal print, Braille printed on computer tape, a tactile reading system, and synthetic speech. This project has developed courseware for a CAI/COS (Computer Assisted Instruction/Computer Output Speech) system which instructs and/or evaluates visually handicapped persons in three areas: (1) keyboard training; (2) speech intelligibility and student readiness testing; and (3) vocational/technical instruction. Potential uses of the courseware include training for positions dealing with data base query systems, diagnosis and remediation of reading problems, and increased accessibility of visually handicapped persons into a wider range of job opportunities. The system uses a Hewlett Packard 2000 minicomputer to network with CAI/COS work stations consisting of a terminal, an electronic speech synthesizer, an audio speaker, and telephone communications equipment. A special instructional dialogue facility runs on the HP-2000 to allow CAI lessons to be developed by nonprogrammers.

010 Barnes, O.D., & Finkelstein, A. The role of computer assisted instruction at the National Institute for the Deaf. American Annals of the Deaf, 1971, 116, 465-468.

Computer assisted instruction (CAI) software for instruction of deaf college students has been developed and implemented at the National Technological Institute for the Deaf at Rochester Institute of Technology. Hardware consisted of an IBM 1500 instructional system which provided a heavy concentration of visual stimuli through a video monitor and a random access filmstrip projector. The Mathematics Diagnostic System (MDS) was written to diagnose and instruct deaf students in prerequisite math skills. MDS consists of 21 high school and college level segments of math learning. If a student answers a problem correctly, MDS presents a more complex diagnostic problem. If the person answers incorrectly, the program branches back to primitives integral to the solution. The branching continues until a level of competence is reached, at which point, remedial instruction is initiated. In addition to diagnosis and remediation, performance reporting is incorporated into the system.

011 Batie, H. Handi-Writer: A video note pad for the physically handicapped. Byte, 1981, 6(12), 474-482.

An overview and technical description is provided of a two-way communication system for severely physically handicapped persons. The system displays the alphabet, the numbers 0 thru 9, and 29 commonly used words. The user writes a message by moving a blinking cursor to the character/word desired and then pushing a "PRINT" button. The cursor is moved by four other buttons representing up, down, left, and right. Four lines of 32 characters each can be displayed on the monitor and a total of 32 lines can be held in memory for recall. The system hardware consists of a TRS-80 Model I microcomputer with 16K bytes of memory, the special five button selector panel, and the Handi-Writer interface board. A listing is provided of the BASIC program which handles communications between the TRS-80 and the interface. A schematic diagram of the Handi-Writer interface is also included.

012 Bennett, R.E. Applications of microcomputer technology to special education. Exceptional Children, 1982, 49, 106-113.

Describes current application areas of low-cost microcomputers within special education. The five areas discussed are administration, assessment, instruction, related services, and staff development. Administrative information is used for compliance monitoring, applying for entitlement monies, projecting future resource needs, and managing day-to-day functions of the service delivery system. Assessment applications support the decision making process related to service eligibility, diagnostic classification, educational programming and placement, and progress review. Instructional applications assist the special educator to plan, supplement, present, and redefine traditional concepts of instruction. Applications discussed under related services include communication therapy, counseling, occupational and physical therapy, and transportation. The article concludes that special educators need to become knowledgeable about the available microcomputer technologies and be able to assess the relevancy of particular innovations to their own needs.

013 Berthold, H.C., & Sachs, R.H. Education of the minimally brain damaged child by computer and by teacher. Programmed Learning and Educational Technology, 1974, 11, 121-124.

A study was conducted to determine the effectiveness of computerized instruction using a teacher learned computer language. The computer language used was easily learned and implemented by special education teachers with no computer science background. Selected teachers, having learned the language, wrote their own computer assisted instruction (CAI) drill and practice programs. Three treatment conditions were used to assess the performance and attentiveness of six special education students. During a six week period all students were assigned in random order to each of the three conditions: (1) computer instruction only; (2) computer and teacher instruction; and (3) teacher instruction only. All students were administered a pre and post performance test. Results indicate no significant performance gain differences between teacher only interaction and computer-teacher interactions.

014 Bitzer, D. Uses of CBE for the handicapped. American Annals of the Deaf, 1979, 124, 553-558.

Discusses several computer-based education (CBE) projects for the handicapped. First, an historical overview of the PLATO system originally established at the University of Illinois and currently present in six other settings is provided. The Illinois system currently has

1,100 terminals at 185 locations connected to the central computer, over 3,000 authors who generate new lesson material, and more than 16,000 hours of lesson material covering 150 subject areas. Second, three types of PLATO computer projects for the handicapped were briefly introduced: (1) direct instruction of the handicapped student; (2) instruction and education to those who work with the handicapped; and (3) computer-generated materials for the handicapped including automatically-printing braille materials.

015 Blackhurst, A.E. Technology in special education: Some implications. *Exceptional Children*, 1965, *31*, 449-456.

Presents potential applications of computer-based-instructional-systems for different categories of exceptional children. The categories discussed are: (1) visually handicapped; (2) cerebral palsied physically disabled; (3) hearing handicapped; (4) behavioral deviant; (5) mentally retarded; (6) learning disabled; and (7) gifted. Within each category the characteristics of the exceptionality are described as well as a specification of learning needs and appropriate display and response mechanisms to overcome educational deficits.

016 Blaszczyk, H. Computing and the handicapped: The challenge in education. *Computer*, 1981, *14*(1), 15-17.

Since the passage of P.L. 94-142, educators have been attempting to better meet the needs of handicapped students. This goal can be more effectively met if the available technology of computerized education is implemented for special education classes. Three factors are presented for consideration in joining computer technology and special education. First, cooperation is needed between the two fields. Educators should have input into the development of assistive devices and computer scientists should be involved in the educational process so that they are aware of the needs of special students. Secondly, more technological applications need to be modified or developed for handicapped students. Finally, designs for the applications need to be practical, adaptable/flexible, portable, affordable, available, serviceable, and operable.

017 Boles, S. *Specialized Training Program (STP) information system--A summary (unpublished paper).* Eugene, OR: University of Oregon, Center on Human Development, 1980.

Summarizes an automated measurement and reporting system which has been implemented in a sheltered workshop for mentally retarded persons. Workshop and client reports are produced to summarize the performance of all workers, summarize the time distribution of workers and staff, track individual progress on a daily or a monthly basis, develop production schedules, and report financial status. Additionally, client reports can be integrated into individualized habilitation plans. The system is implemented on the TRS-80 Model III microcomputer.

018 Bower, A.C., & Richardson, D.H. A computer based data bank. Mental Retardation, 1975, 13(1), 32-33.

Describes a computer-based data bank developed at a large facility for the retarded in Ontario, Canada. The system provides for rapid access to information regarding patient progress and services which serve as a basis for prognostic statements. The system consists of 29 medical record items, 44 intake questionnaire items, and 167 items obtained from the Adaptive Behavior Scale. Records are accessed and analyzed through the use of the Statistical Package for the Social Sciences (SPSS). Benefits of this system are identified as its ability to: (1) select cases for analysis according to a variety of variables; (2) monitor treatment to maintain a high level of care or training; (3) perform correlations or other research analyses; and (4) simulate a return to the community using placement guidelines and resident characteristics to produce a recommendation of needed services.

"Microcomputers in special education classrooms can be an exciting and innovative addition to the educational environment of handicapped learners. Students are fascinated with the computer and enjoy it. The fascination with this technology enables many of them to increase their concentration and attention span and to actively participate in the learning process." (Hannaford and Sloane, 2)

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019 Brebner, A., Hallworth, H.J., & Brown, R.I. Computer-assisted instruction programs and terminals for the mentally retarded. Education and Training, 1977, 2, 421-426.

Summarizes the development of a computer assisted instruction (CAI) system for mentally retarded persons. The system was implemented at the Vocational and Rehabilitation Research Institute (VRRI) in Calgary. Computer programs were written to teach survival skills, i.e., math, reading, calendar use, time telling, job applications and interviews, and appropriate dress. Programs were constructed to progress along the entire continuum for each curricular area. For example, a series of CAI math programs begin with counting, move to addition and subtraction, and end with bank account maintenance. Additionally, VRRI incorporated various input and output devices such as a touch sensitive display, computer driven cassette recorders, computer driven slide projectors, POSSUM light indicator communication board, and special adapted keyboards.

020 Brinker, R.P., & Lewis, M. Making the world work with microcomputers: A learning prosthesis for handicapped infants. Exceptional Children, 1982, 49, 163-170.

Describes the use of the Contingency Intervention System (CIS) in the first few months of life of handicapped infants. CIS is implemented on the Apple II microcomputer to control the relationship between movements and consequences, record the frequency and duration of an infant's movements, and communicate to interventions and parents the results of an infant's learning experiences. The system can accept up to eight inputs from an infant and provide up to eight different outputs. Inputs include movement of foot, movement of arm, and reaching for an object. Outputs include such things as playing different kinds of tape-recorded music. The three stages of the process are to identify movements the infant can make, select consequent events that accelerate infant response, and then teach the infant to control environmental consequences with specific movements. The underlying theory of this cognitive intervention program is also briefly presented.

021 Brown, N.P. CAMEO: Computer-assisted management of educational objectives. Exceptional Children, 1982, 49, 151-153.

Presents a computerized system for the creation and maintenance of individualized educational programs (IEPs). The CAMEO data base stores information on approximately 7,000 measurable objectives in the areas of language arts, mathematics, physical education, sensorimotor development, social skills, daily living skills, career development, and applied arts. A keyword system allows teachers to locate objectives which address a specific target skill. CAMEO was developed and field tested by the Multonomah County Education Service District in Portland, Oregon. The system runs on a Hewlett-Packard 3000 computer and can be accessed by terminal or through a control batch processing system. Field test results show that 79% of responding teachers felt CAMEO reduced IEP work time and that 90% felt it adequately addressed student needs.

022 Browning, P., & Nave, G. (Principal Investigators). Assessment and training of adaptive behavior with mentally retarded people via computer assisted video instruction. The research and training center on improving community integration of mentally retarded individuals (grant application). Eugene, OR: University of Oregon, Rehabilitation Research and Training Center in Mental Retardation, 1982.

The purpose of this research project is to develop computer assisted video instruction (CAVI) courseware for the assessment and training of adaptive behavior with mentally retarded people. The four major goals of the project are to: (1) prepare a state-of-the-art document on the assessment and instructional application of CAVI with the handicapped in general and the mentally retarded in particular;

(2) investigate the conditions under which mentally retarded people optimally learn through the use of CAVI; (3) develop CAVI courseware designed to both assess and teach mentally retarded people community adjustment skills, i.e., vocational, social, and independent living; and (4) implement a dissemination/utilization plan. The eight project objectives set forth to accomplish these goals include such activities as review and analysis of pertinent literature and existing courseware, a series of programmatic studies, and the development and field testing of courseware.

023 Bruey, A.J. Microcomputer hardware for the handicapped. Microcomputing, November 1980, 173-174.

Briefly describes the implementation of a simple scanner-type communication device for severely handicapped people using the BASIC programming language on the PET microcomputer. A push-button switch is connected to the user port on the PET. The user pushes the button on the "on" position when the system cursor is on the character desired for constructing a message. The input choices are the alphabet, the digets 0 to 9, and a few special symbols. The character set appears on the bottom half of the screen and the users message is constructed on the top half of the screen.

024 Budoff, M. Microcomputers in special education. Cambridge, MA: Ware Press, P.O. Box 397, 02138, in press.

This book is a practical introduction to the microcomputer to be used for direct instructional purposes. It uses teacher experiences to describe various scenarios for using the microcomputer in special education settings. Case studies of actual teacher's use of micros as aids to the instructional process are presented.

025 Budoff, M., & Hutten, L. Microcomputers in special education: Promises and pitfalls. Exceptional Children, 1982, 49, 123-128.

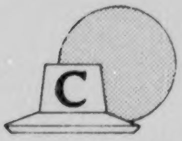
The major statement of this analysis of computer assisted instruction (CAI) in special education is that, although microcomputer systems have great potential, their limitations should be recognized. Also, educators must become knowledgeable of what is currently possible and what will be available in the future. While two major hardware problems--high cost and low reliability--have been overcome by advances in microelectronics, other problems remain. For example, varying available hardware raises questions of how to best configure a system to best meet the instructional objectives of a given setting. Changes in central processors, mass data storage devices, memory size, and available peripherals also raise a number of unanswered questions as to optimum program construction and integration. Six modes of CAI are briefly outlined. They are drill and practice, tutorial, educational games, simulations, problem solving, and computer managed instruction (CMI). Other than drill and practice, there is very little research data to analyze the effectiveness of the CAI software currently available. Benefits of CAI to the child, the teacher, and the system are also discussed.

026 *Bulletins on science technology for the handicapped*. Projects on the Handicapped in Science. American Association for the Advancement of Science, Office of Opportunities in Science, 1515 Massachusetts, N.W., Washington, D.C., 20205.

This is a free quarterly periodical published by the American Association for the Advancement of Science, with the assistance of a special grant from the National Science Foundation. It is an outgrowth of the Project on the Handicapped in Science (PHS). Bulletins report on workshops conducted by PHS, current research, potential funding sources for research and development, and resource lists for additional information for consumers of technology for the handicapped.

027 Burchwell, J.E. Computer based student achievement monitoring for trainable mentally impaired students at Oakland Training Institute (Doctoral dissertation, Wayne State University, 1976). *Dissertation Abstracts International*, 1976, *37*, 2782A. (University Microfilms No. 76-26, 116.)

Presents a study to explore the effectiveness of the computer-based Student Achievement Monitor (SAM) system for recording training objectives of trainable mentally retarded students. A survey was conducted to determine the attitudes of various groups towards the use of SAM. Subjects included TMR students (N = 100), staff (N = 48), teachers (N = 24), aides (N = 17), teacher assistants (N = 7), and parents (N = 68). Results indicate that SAM technology was less time consuming and more accurate than paper and pencil techniques, and that the use of SAM would strengthen the entire school curriculum. It was recommended that SAM be implemented throughout the training center, and that professionally conducted workshops be provided so that parents could learn to interpret SAM reports.



028 Carman, G., & Kosberg, B. Educational technology research: Computer technology and the education of emotionally handicapped children. *Educational Technology*, 1981, *22*(2), 26-30.

The purpose of this study was to examine the effect of providing teachers of the emotionally handicapped with help in the form of a computer-managed and computer assisted program. Forty emotionally handicapped children served as subjects for this study. They ranged in age from 7 to 14 years and were of normal intelligence but were averaging more than two years of academic retardation in math. Over the course of the academic year all students were exposed to the PLATO Computer-Managed Instruction Program for varying lengths of time. This management system provided teachers capabilities for pretesting and posttesting, diagnostic prescription, student-tracking, and report generating. In addition, PLATO was used to supplement classroom instruction through computer assisted instruction (CAI). The instructional year in mathematics was divided into three 8-week parts. Subjects were randomly sorted into two groups and the treatment conditions (CAI and non-CAI) were alternated for each group for the three 8-week periods. The standard achievement test was the dependent measure used to determine math gain. Even though the study demonstrated that learning rate could be accelerated, learning rate could be maintained. However, the CAI groups in all three 8-week periods paid significantly more attention to task.

029 Cartwright, C.A., Cartwright, G.P., & Robine, G.C. CAI course in the early identification of handicapped children. Exceptional Children, 1972, 38, 453-459.

Compares the efficacy and efficiency of two approaches to teaching skill to elementary education majors for the early identification of handicapped learners. The two methods investigated were: (1) conventional instruction (CI), which consisted of class attendance, lecture, demonstration, guest speakers, films, discussion, etc.; and (2) computer assisted instruction (CAI), which consisted of individualized computer interaction only. Twenty seven students were randomly selected for CAI presentation from the 114 enrolled in the target college class. Following completion of the course, a 75 item criterion referenced test was administered to all subjects. Results indicate that the mean scores for students receiving CAI instruction were significantly higher than the mean scores of the CI group. A post hoc measure showed that all CAI subjects except two were above the neutral point on attitude toward CAI.

030 Cartwright, G.P., & Cartwright, C.A. Early identification of handicapped children: A CAI course. The Journal of Teacher Education, 1973, 24, 128-134.

Discusses a project designed to provide classroom teachers with the knowledge and skills to identify and effectively deal with learning handicapped children. Course content for this in-service program was computerized. All hardware and equipment were housed on a mobile van so that teachers in remote, rural areas could be served. The mobile unit contained, among other equipment, fifteen microcomputers. A maximum of 150 teachers could participate in the project during one six to eight week stop. All instruction was individualized to allow participants to arrange their own training schedule after school and on weekends. Course objectives were to, improve knowledge of handicapped children's characteristics, skills to screen all children, selection and use of diagnostic materials, synthesis of collected information, evaluation of information to facilitate making a referral decision, and preparation of adequate documentation.

031 Casey, K. Computer applications for the deaf and deaf-blind. Directions, 1981, 1(4).

This is one of 10 articles which addresses the area of programming and placement for hearing impaired individuals. Directions can be obtained from Box 5664, Washington, D.C., 20016.

032 Catalyst (Newsletter). Western Center for Microcomputers in Special Education, 1259 El Camino Real, Suite 275, Menlo Park, California, 94025.

This bi-monthly newsletter is specifically intended to assist special educators and related professionals with computer assisted instruction (CAI) for disabled people. The purpose of the newsletter is to disseminate information about recent research, hardware and software development, and applications of computers in special education. The Catalyst is available for $20 to institutions and $12 to individuals.

033 Cerf, V. The electronic mailbox: A new communication tool for the hearing impaired. American Annals of the Deaf, 1978, 123, 768-772.

Discusses the interface of computer-aided text manipulation and computer communication capabilities which makes electronic mail service systems possible. In such a system, each user has a "mailbox" or a file of messages which can expand as incoming messages arrive. Special programs can aid users in composing, storing, reading, and manipulating messages. Three problems are presented which must be resolved before electronic mail can be considered a viable tool for private communication for hearing impaired persons. The first issue concerns what to do with approximately 30,000 Baudot teletypes in use in the hearing impaired community. They are incompatible with commonly available computer communication networks. Secondly, a sufficient set of services must be created to make the electronic mail system useful. The third issue concerns the "tangled web" of current regulations regarding message services and the U.S. Postal Service. The author concludes, however, that the widespread penetration of this service is inevitable.

034 Chaffin, J.D., Maxwell, B., & Thompson, B. ARC-ED curriculum: The application of video game formats to educational software. Exceptional Children, 1982, 49, 173-178.

The authors designed and developed six educational games dealing with basic arithmetic facts and employing four motivational features of video arcade games. These features are feedback, improvement, high response rates, and unlimited scoring potential as performance improves. Players are provided immediate feedback by a constantly updated score on the screen. As familiarity with a game grows, players anticipate events and develop strategies which improve their scores. Fast paced video games often require in excess of 100 responses per minute. Graphics, sound, and color are considered to be lesser motivators. ARC-ED, which stands for academic educational games, is offered to both general and special educators as a substantially different alternative to traditional computer assisted instruction. Several long standing educational premises are taken exception to by ARC-ED. One example is, rather than stressing the importance of success, ARC-ED stresses the amount of improvement as measured by higher scores.

035 Chiang, A. Demonstration of the use of computer assisted instruction with handicapped children: Final report. Arlington, VA: RMC Research Corp., 1978. (ERIC Documentation Reproduction Service No. ED 166 913.)

This final report describes ASSIST, a teacher-controlled computer assisted instruction (CAI) system in special education. ASSIST stands for Authoring System Supplementing Instruction Selected by Teachers. It was developed after a survey of CAI courseware concluded that existing materials did not accommodate the needs of special education students because their contents were too difficult, step sizes were too large, and their paces of instruction too fast. A year was spent developing ASSIST and another year field testing it with 200 handicapped elementary and junior high students in Cupertino, California. This final report describes ASSIST and presents project evaluation results.

> ***"The move toward more portable and flexible microcomputers is revolutionizing the design and development of electronic assistive devices for the disabled, ensuring the status of powerful, low-cost microcomputers as valuable tools for disabled individuals and those working with them."*** (Vanderheiden, 3)

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036 Cimler, E.R., & Henderson, W.H. The application of microcomputers to sheltered workshop operation. Seattle, WA, 98121: Northwest Assocation of Rehabilitation Industries, 2819 First Avenue, Suite 330, 1979.

Provides a non-technical introduction to selection and implementation of a microcomputer system within a sheltered workshop environment. Two chapters provide a brief overview of how computers work and how computer programs are developed. An extensive list of potential applications are then discussed: (1) administrative (financial, personnel, purchasing); (2) program information (service data, client case records, progress reports); (3) production information (schedules, reports, cost data analysis, inventory control); (4) program evaluation; and (5) research.

037 *Closing the gap* (Newsletter). Route 2, Box 39, Henderson, Minnesota, 56044.

Closing the Gap is a newsletter which pertains exclusively to microcomputers for the handicapped. The primary objectives of the publication are to: (1) update the reader on the latest results of research and development programs pertaining to handicapped persons; and (2) provide information necessary to acquire this material. Subscriptions are $15 for one year (six issues).

038 Cogen, V. The computers role in education and use with the exceptional child. *Mental Retardation*, 1969, *7*(4), 38-41.

Examines the potential areas of benefit to special educators of computers, and specifically, computer assisted instruction (CAI). CAI programs are defined as controlled learning situations using stimuli for leading the student to the desired response. The key problem in CAI development has been the selection and arrangement of the appropriate stimuli to fit the learner's needs. A list of 17 advantages of CAI for the mentally handicapped is presented. Also, 22 potential areas for computer research into the educational process are listed.

039 Colby, K.M., & Kraemer, H.C. An objective measurement of nonspeaking children's performance with a computer-controlled program for the stimulation of language behavior. *Journal of Autism and Childhood Schizophrenia*, 1975, *5*, 139-146.

A method is described for recording a child's performance with a computer controlled audio-visual device designed to stimulate language behavior in nonspeaking children. Patterns of normal children are considered as norms, and changes in the patterns of nonspeaking children towards these norms are considered as improvement. The procedure is implemented in the following manner. A child and a trainer sit at a microcomputer with a keyboard and display screen. When the child depresses any key, s/he is presented with visual stimulation on the screen (word, symbol, expression, or drawing) and simultaneously with auditory stimulation (human voice, animal or machine sound). The intent is for the child to imitate the sound prior to depressing another key. The time of delay between depression of the keys is recorded by the computer.

040 Comden, T. The many uses of Apple Computers at the Western Pennsylvania School for the Deaf. *American Annals of the Deaf*, 1981, *126*, 591-599.

The Western Pennsylvania School for the Deaf purchased an Apple II computer to teach high school seniors how to program in BASIC. Soon they were using it for a multitude of other purposes as well. The other uses discussed are word processing of newspaper articles for a journalism class, producing mailing labels, accessing through a modem a career and college guidance system on a larger computer, inventory control, storage and manipulation of large research data bases, and record keeping of film rentals.

041 *Communication outlook* (periodical). Artificial Language Laboratory. Computer Science Department, Michigan State University, East Lansing, Michigan, 48824.

Communication Outlook is an international publication pertaining to the application of techniques and aids for persons who experience communication handicaps due to neurological or neuromuscular conditions. This periodical is edited and published jointly by the Artificial Language Laboratory at Michigan State University and the Trace Center for the Severely Communicatively Handicapped at the University of Wisconsin at Madison. Annual subscriptions are $12 for four issues.

042 *Computer Assisted Instruction for Handicapped Children and Youth (No. 506).* CEC/ERIC Computer search reprints, CEC Publications Sales, 1920 Association Drive, Reston, Virginia, 22091.

This computer search document consists of 100 bibliographic abstracts on the above topic. The literature is derived from both the Exceptional Child Education Resources (ECER) and Educational Resources Information Center (ERIC) data bases. The price of this computer search reprint is $8.50 for Council for Exceptional Children (CEC) members and $10 for all other purchasers.

043 Computer Assisted Instruction for Handicapped Individuals. *Programs for the Handicapped* (May/June 1982, No. 3, pp. 5-8). Clearinghouse on the Handicapped, Office of Information and Resources for the Handicapped, Room 3119, Switzer Building, Washington, D.C., 20202.

Briefly addresses computer assisted instruction (CAI) within the context of hardware and software barriers for disabled individuals. In addition, the following resources pertaining to computers for the handicapped are discussed: (1) The Trace Research and Development Center for the Severely Communicatively Handicapped, which among other things provides a registry of microcomputer software for the handicapped; (2) The Northwest Regional Education Laboratory's Microsift Project, which provides a bibliographic retrieval service concerning the use of computers in education; (3) Vital Information, which is a national clearinghouse for information on microcomputer software; and (4) Closing the Gap and Catalyst, both of which are bimonthly newsletters on how computers can assist handicapped individuals.

044 Computer assisted instruction for the mentally retarded. Rhode Island: Providence College, 1965. (ERIC Document Reproduction Service No. ED 021 353.)

Presents technical information pertinent to an in-service training program on computer assisted instruction (CAI) for special educators. Included in the program are: (1) a definition and description of CAI; (2) advantages of using CAI; (3) the role of students; (4) the role of classroom teachers; (5) a descripton of a teacher implemented authoring language; (6) guidelines for using CAI and the authoring language; and (7) program listings and output for two teacher written programs. The advantages of CAI include student individualization, differences, reduction of teacher time spent in information transmission and clerical work, production of permanent records of student learning, active participation by students, administration of immediate feedback, and immediate incorporation of curriculum changes.

045 Computer assisted rehabilitation service delivery. Eighth Institute on Rehabilitation Issues. Administration, Training and Publications Staff, One Dunbar Plaza, Suite E, Dunbar, West Virginia, 25064. West Virginia Research and Training Center, 1982.

Reviews the current and potential applications of computers and related technology to the rehabilitation system. The stated objectives for the conference manuscript were to: (1) identify and describe the major ways computers are being used to assist service delivery in state vocational rehabilitation (VR) agencies; (2) identify and describe uses of computers which have potential for adaptation to VR service delivery needs; (3) describe a VR office as it could exist today if computers were optimally used; (4) describe in basic terms the major elements of computer systems; (5) present guidelines for planning the development of new or expanded computer systems within VR agencies; and (6) discuss the problems and fears associated with computers.

046 Computing and the handicapped. Computer (special issue), 14(1).

This special issue contains 9 articles, the titles of which are: (1) Computing and the Handicapped: Guest Editor's Introduction; (2) Computing and the Handicapped: A Promising Alliance; (3) Computing and the Handicapped: The Challenge in Education; (4) Intelligent Prosthetic Devices; (5) Communication Devices for the NonVocal Disabled; (6) The Impact of Microcomputers on Devices to Aid the Handicapped; (7) A Computer-Aided Robotic Arm/Worktable System for the High-Level Quadriplegic; (8) Rehabilitation and the Handicapped Programmer; and (9) Practical Application of Microcomputers to Aid the Handicapped.

047 Computers and the handicapped: A photo essay. People's Computers, 1978, 6(6), 26.

Briefly presents two examples of the application of computer technology for the handicapped. The first case portrays a cerebral palsied individual using her Poly-88 based communications system, which is mounted on a wheelchair and is controlled by a knee jerk switch. She can build messages on the CRT either by selecting words from a 1200 word vocabulary or by spelling them out. The developer of the system is Tim Scully, an inmate at the McNeil Island Penitentiary. The other case shows Stevie Wonder interacting with a talking computer at the Michigan State University Artificial Language Laboratory.

048 COPH Bulletin. Committee on Personal Computers and the Handicapped. 2030 Irving Park Road, Chicago, Illinois, 60618.

COPH Bulletin and Link and Go are official publications of the Committee on Personal Computers and the Handicapped (COPH-2), which is a self-help organization intended to enable persons with disabilities to use the same computer technologies as the public-at-large. Specifically, the purpose of COPH-2 is to search out, evaluate and share personal computer information which is deemed relevant to persons with disabilities. Membership dues are $8 a year and include subscriptions to both newsletters which cover such topics as: (1) what kinds of computer hardware and software may be used by persons with disabilities; (2) how the computer may be used by persons with disabilities for school, work, or play; (3) how software has been adapted to the conditions of some disabled individuals such as a computer dictionary to generate text; (4) how children with disabilities can use computers as an integral part of their personal development; and (5) how to locate educational materials that were developed with disabled individuals in mind. COPH-2 had 97 members during its first year which began April 1, 1981 and held its first annual "Computerfest" at Chicago's Museum of Science and Industry in July of 1982.

049 Crawford, J.L. Computer support and the clinical process: An automated behavioral rehabilitation system for mentally retarded persons. Mental Retardation, 1980, 18, 119-124.

Describes computerized management of service delivery systems within the mental health/mental retardation field. The clinical process is presented in relation to implementation of a data-based management system referred to as the Behavioral Rehabilitation System (BRS). Developed at the Rockland Research Institute, the BRS runs on an IBM 370/158 computer and consists of three components, i.e., client assessment, treatment selection, and treatment plan documentation. Clients are assessed with the Rockland Assessment of Functional Behavior to assist in formulation of a treatment plan. The documentation component provides output consisting of a detailed description of a skill specific intervention, a listing of required equipment, special restrictions, and a reference list for further details on the intervention.

050 Cronin, B. The DAVID SYSTEM: The development of an interactive video system at the National Technical Institute for the Deaf. American Annals of the Deaf, 1979, 124, 616-618.

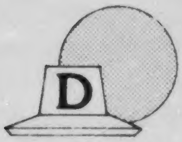
Briefly describes the Data Analysis Video Interactive Device (DAVID) system developed at the National Technical Institute for the Deaf (NTID) at Rochester Institute of Technology. The system was developed to teach speechreading skills, but has potential in many other instructional areas such as sign language instruction. A microcomputer interfaces a Wang VP minicomputer to a specially modified Sony 2850 videotape recorder. The "Job Interview Game" is an interactive program developed on DAVID to simulate a conversation. It contains 100 different video segments to allow for as many program branches within the interview as possible.

051 Culbertson, L.B. CAI-beneficial teaching tool at Texas School for the Deaf. American Annals of the Deaf, 1974, 119, 34-40.

Describes the computer assisted instruction (CAI) programs for the deaf developed by the Institute for Mathematical Studies in the Social Sciences (IMSSS) at Stanford University. These programs were implemented into the curriculum at the Texas School for the Deaf from 1971 thru 1973. The author provides a description and evaluation of the two major components of the CAI package--the mathematics and the language arts programs. A brief outline of the development of CAI for the deaf at IMSSS is also given. The conclusion of the Texas study is that CAI students made better progress than non-CAI students.

052 Curtis, M., & Semancik, S. Micros with the handicapped. Compute, 1982, 4(4), 98-99.

The first of a series of five articles written with the intent of helping the reader by the end of the sequence of articles to be able to create their own individualized version of a communication program to be used with a PET Commodore. The rationale for this objective is that typical communications boards used by non-verbal handicapped individuals have several shortcomings, e.g., they are time consuming, require concentration of both the sender and receiver in order to remember previous letters and symbols indicated in the message, they are expensive, and they are not easily modifiable for individual needs. The Delmarva Computer Club has developed a communications program for the PET/CBM computer that uses both the keyboard and an alternative input device, i.e., light sensor. The five fundamental areas to be addressed in this and the subsequent four articles are: (1) how to pick a word list, statements list, and/or characters list, from which selections will be made to allow the level of communication desired; (2) how to indicate which element of the list is selected, including consideration of flexible response time; (3) how to pick an alternative method of input, either using the keyboard differently, or selecting a device to match the motor skills of the user and interfacing the device to the computer; (4) how to form a message as selections are made, and how to get attention paid to special messages; and (5) besides selecting from a list, how to decide on other options in order to improve the speed of communication, as well as the ease of computer use.



053 Day, H., & Parnes, R. A computer based simulation as an alternative teacher training strategy. Paper presented at the Annual American Educational Research Association (AERA), Washington, D.C., March 1975. (ERIC Document Reproduction Service No. ED 112 579.)

Discussed is a computer based simulation program designed to provide teachers with practice in making pupil behavioral interventions. Cases of five hypothetical handicapped children are used to present teachers with simulated classroom management problems.

> ***"Personal computers may offer their greatest benefits to still another group of people—those who, for one reason or another, have limited abilities to influence and interact with the outside world. . . . For them, personal computers can help bridge the barriers imposed by their handicaps."*** (Lavine, 4)

054 Deane, B. The talking wheelchair: A computer age prosthesis for people with communication handicaps. Creative Computing, 1982, 8(3), 62-66.

Describes the hardware, software, and functional elements of the "talking wheelchair" or Versatile Portable Speech Prosthesis (VPSP). The VPSP was put together through the Rehabilitation Engineering Department, Children's Hospital, at Stanford University. The hardware is mounted on wheelchair and runs off a standard 24-volt wheelchair battery. Some of the hardware described includes an Z-80 based computer with 16K RAM, mini-floppy disk drive and a special interface board for the CRT and synthesizer, and a Votrax Model ML-1 phoneme speech synthesizer. In addition, the user can choose any one of three control systems, i.e., keyboard, joystick, and single switch. While the current version is somewhat bulky and "has the appearance of a car put together with spare parts," the entire VPSP will eventually be reduced to briefcase size so that it can be carried around by ambulatory users as well as mounted on wheelchairs. The inventors also estimate that its cost will be comparable to a good home computer.

055 Demasco, P., & Foulds, R. A new horizon for nonvocal communication devices. Byte, 1982, 7(9), 166-182.

Describes three implementations of the Panasonic Hand-Held Computer (HHC) as a portable communication device for individuals with expressive communication impairments due to physical disabilities. The devices were developed at the Rehabilitation Engineering Center at Tufts University to serve as: (1) a scanning communicator; (2) a direct-selection communicator using a keyboard; and (3) a direct-selection communicator using a digitizing tablet. The HHC combines the portability of previous single-purpose communicators with the extra flexibility and low-cost of new personal computers.

056 Dirr, P.J., & Anderson, S.M. Design and documentation of improved instructional programs for disadvantaged handicapped children. Buffalo, NY: 1974. (ERIC Document Reproduction Service No. ED 094 535.)

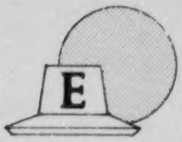
This document is the final report of a federally funded project with three diverse objectives. The third objective was to investigate applications of the computer for diagnosing and prescribing instructional programs for handicapped children in the areas of mathematics and language arts. A pilot study was conducted in the language arts area only. Twelve third grade students were provided with CAI instruction twice a week for one semester on a word recognition skills program written by one of the teachers.

057 Dolman, D. English remediation and the older deaf student: The computer as a tool. American Annals of the Deaf, 1980, 125, 655-661.

Describes the use of computer assisted instruction (CAI) to teach English language grammar skills to deaf students at Harper Community College in Chicago. The author wrote a two level series of CAI lessons to provide as much exercise as possible at the appropriate level for each student. The series is written in the BASIC computer language on a Hewlett Packard HP2000. Results indicate that the CAI program has reduced both student and teacher frustration, but the amount of transfer of skills from CAI exercises to everyday writing is disappointing.

058 Dugdale, S., & Vogel, P. Computer-based instruction for hearing impaired in the classroom. American Annals of the Deaf, 1978, 123, 730-743.

Describes the use of the PLATO system in an intermediate mathematics class of 75 hearing impaired students in grades K-5. PLATO is an interactive network of 1000 computer terminals connected to a large computer at the University of Illinois. PLATO provides instructional material in over 100 subject areas. The system allows the teacher to specify personalized and individualized parameters for the student when setting up lessons and provides a mechanism for maintaining a computer recorded and managed grade book. In addition, the PLATO system is formatted to encourage student-to-student interaction and cooperation. Several adaptations to the system were made to facilitate usage by deaf students. One example is a red light which blinks to let the student know when the touch sensitive screen has accepted an input. This replaces the customary auditory beep. No quantitative results were presented; however, student attitudes were characterized as positive and academic gains were claimed.

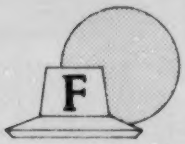


059 Educational technology for the 80's. American Annals of the Deaf (special issue), 1979, 124(5).

This special issue contains nine articles which relate specifically to the use of computers to serve the deaf and hearing impaired. The titles of these articles are: (1) A System for the Synchronization of Continuous Speech with Printed Text; (2) The DAVID System: The Development of an Interactive Video System at the National Technical Institute for the Deaf; (3) A Pilot Experiment in Computer Assisted Speechreading Instruction Utilizing the Data Analysis Video Interactive Device (DAVID); (4) Media Based Interactive Visual Image Controlled (Vis-I-Con) Instructional Delivery System for Instruction of Deaf and Hearing Impaired; (5) Computer-Assisted Instruction at the California School for the Deaf - Past, Present, and Future: An Administrator's View; (6) Computer Supported Braille Applications; (7) The Utilization of the Computer with the Hearing Impaired and the Handicapped; (8) Interfacing an Inexpensive Home Computer to the Videodisc: Educational Applications for the Hearing Impaired; and (9) Illustrating Language through Computer Generated Animation.

060 Evans, R., & Simpkins, K. Computer assisted instruction for the blind. Education of the Visually Handicapped, 1972, 4, 83-85.

Describes a program designed and implemented to supplement classroom math lessons with computerized drill for 43 blind students in grades 4 through 6 at Overbrook School for the Blind in Philadelphia, Pennsylvania. Hardware consisted of terminals using keyboard input, braille printed ticker tape, and audio output. The terminals were used to access a Hewlett Packard computer at West Chester State College. Students were given 20 minutes each day on the system and allowed to advance at their own pace. Students were provided three opportunities to respond correctly to each problem before the correct answer was typed in braille on the tape. The number of correct and incorrect responses was presented at the end of each lesson. Several difficulties with the computerized program are discussed, but the conclusion expressed is that none of the problems were insurmountable and the "program had a promising future."



061 Fant, A. Braille writing in Pascal. Byte, 1982, 7(9), 250-268.

Describes a computer program written by the author for transforming printed material into Braille. The program, written in Pascal, converts English letters into a series of Braille dots and then outputs the message on a modified printer. Information is included on the printer modification procedures and the software package. To modify the printer it is only necessary to tape a covering of thin latex rubber onto the metal platen behind the computer paper. The cushion of latex repositions the paper so that an indentation is left when the printer head strikes the paper. The software package consists of a main program and a procedure to convert English letters into Braille cells. The indentations made by this program fade after about 15 readings, therefore, the system is appropriate for short lived publications such as newspapers, correspondences, and brochures.

062 Fine, R. RT-19's C2E2: Star Wars Alabama style. Informer, 1979, 8(4), 40-42.

Describes a project to develop and evaluate an Apple II microcomputer system for assisting severely disabled individuals in communication, environmental control, education, and entertainment (C2E2). The prototype system was developed at the Rehabilitation Research and Training Center, University of Alabama Medical School in Birmingham. System design criteria included software programmability in a widely available computer language, readily available plug-in compatible components backed by dependable service, and the capability of accepting various inputs, i.e., voice commands, switch closure, joystick. In addition, custom hardware was to be minimized. The menu driven system was developed to perform the following tasks: (1) answer the phone; (2) dial the phone; (3) operate a TV receiver; (4) turn appliances on and off; (5) prepare typewritten material; (6) interact with the user in a video game mode; (7) teach math, vocabulary, etc., through CAI; (8) provide a method for the composition of music; and (9) provide access to other systems through networking.

063 Fleming, F., & Vance, Jr., W. Computerization of pharmaceutical services. Mental Retardation, 1974, 12(4), 37-39.

Describes the computerized pharmaceutical system at the Alabama state institution for the mentally retarded. Its purpose is to improve and facilitate the accurate dispensing of drugs to the approximately 2000 residents of the institution. The system was in response to the order of a federal court to meet standards of programs and services representative of best of care. In less than 18 months after the system was initiated, federal officials acknowledged the institution to be in full compliance. The implementation of the system and the different reports which are generated are explained in the article.

064 Fletcher, J.D., & Suppes, P. Computer-assisted instruction in mathematics and language arts for the deaf: Final report. Washington, D.C.: Bureau of Education for the Handicapped, Division of Research, 1973. (ERIC Document Reproduction Service No. ED 084 871.)

Summarizes a three year project at Stanford University to develop and evaluate computer assisted instruction (CAI) software for hearing impaired or deaf children. Evaluation of the resulting CAI programs was conducted throughout five states and involved 4,000 deaf or hearing impaired students. Individual CAI programs were written in each of the following topical areas: (1) elementary mathematics; (2) word problem solving; (3) language arts; (4) algebra; (5) English; (6) computer programming (BASIC and AID); (7) logic and algebra; and (8) computer games. Each of the above programs is briefly described, as well as their evaluation methods and results. In general, conclusions from the numerous evaluations are reported to indicate that CAI was successfully used by deaf students. A major drawback was the high cost of the program.

065 Foulds, R.A. Applications of microcomputers in the education of the physically disabled child. Exceptional Children, 1982, 49, 155-162.

The mainstreaming of physically disabled students would not be possible without some accommodation to the physical differences between students. The use of the microcomputer and other electronic devices represents a major advance in the attempt to provide assistance in improving communication devices for disabled persons. The flexibility of the computer allows the limited motor skills of the disabled child to be amplified to expand the child's interaction with the world. A brief history of the development of expressive communication tools is presented. Four examples of how personal computers can accommodate for disabilities are also discussed. They are the microcomputer as a single input device, the microcomputer as a direct selection aid, computer enhancement of communication, and speech synthesis. Future communication aids will improve over current aids by being battery operated and, therefore, truly portable.

066 Fox, R.G. Micro-processor based visual image controlled (VIS-I-CON) instruction delivery system for deaf and hearing impaired persons. Journal of Special Education Technology, 1979, 3(1), 15-21.

Describes and discusses the Vis-I-Con (Visual Image Controlled) Instruction Delivery System, developed at the Learning Technology Institute in Warrenton, Virginia. The system is based around the Intel 8085 microprocessor chip and uses addressable film sequences and audio taped messages. A course module (one or more filmed sequences of material) and a program instruction module, control the student's interaction with the system. A multiple-choice response format is used to check for understanding. Depending upon the response, the system is directed to stop, repeat a sequence, or skip to a new sequence. User authoring capabilities allow teachers to construct their own course modules. Advantages of the Vis-I-Con system are reported to include simplicity, local instruction materials development, transferability of programs, and flexibility.

067 Galbraith, G. An interactive computer system for teaching language skills to deaf children. American Annals of the Deaf, 1978, 123, 706-711.

Describes the methodological and technical background of a project at UCLA to develop computer assisted instruction (CAI) software for deaf children. The CAI programs are an implementation of the basic language skills curriculum described in Building Blocks for Developing Basic Language. Progression through each program is linear until errors cause the program to branch into a remediation mode. Test items are interspersed throughout the programs so students progress is continuously evaluated. Program content incorporates increasing levels of communication difficulty, associating manual signs and finger spelling with written words and pictures, and increasing levels of sentence pattern complexity. Hardware for this system includes a Data General NOVA 3/12 minicomputer with 65K bytes of core storage, 10 megabytes of hard disk, and the color-graphic Ramtek Micrographic terminal. Additional features are speech synthesizers used for amplification and three response mode options; i.e., touch input, keyboard entry, and joystick manipulation.

068 Galbraith, G., Lennan, R., & Peterson, R. Interfacing an inexpensive home computer to the videodisc: Educational applications for the hearing impaired. American Annals of the Deaf, 1979, 124(5), 536-541.

Describes two computer assisted instruction (CAI) systems to teach young deaf and multihandicapped deaf children at UCLA's Pacific State Hospital. The first system uses color computer generated displays to teach language skills. Hardware consists of a Data General NOVA 3/12 computer, a RAMTEK 6000 Micrographic terminal, and a Talo digitizing tablet. Limitations are that visual displays are drawings, lack of portability of the system, excessive memory needs, and cost of the system. The second system represents a technology still in the early stages of growth, but addresses the previous problems. The system interfaces a TRS-80 microcomputer with the MCA Model 700 Videodisc Player. A future need for such systems is the ability to place captions on the videodisc material.

069 Geoffrion, L.D., & Bergeron, R.D. Initial reading through computer animation. Paper presented at the American Educational Research Association. New York, NY. April 1977. (ERIC Document Reproduction Service No. ED 138 929.)

Presents the Computer Animated Reading Instruction System (CARIS) which was designed to introduce reading and language skills to children with severe communication and learning handicaps. Two of the three system phases were implemented on a PDP 11/40 minicomputer at the University of New Hampshire. The first phase proceeds in the following manner: (1) five printed nouns are displayed on the terminal screen; (2) when any of the nouns are touched with a light pen the words are replaced by a picture representing the selected noun; (3) five printed verbs are displayed on the terminal screen; and (4) when a verb is touched the list is replaced by a cartoon character representing the noun performing the action represented by the verb. In the second phase the ordering of the words within the noun and verb lists are randomly rearranged on each trial. Findings are said to indicate CARIS needed a greater variety of activities and a generalization training component.

"Nowhere are the benefits of learning with personal computers more dramatic than with the handicapped, whose physical limitations have been a barrier to an education." (Jung, 5)

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070 Geoffrion, L.D., & Goldenberg, E.P. Computer-based exploratory learning systems for communication-handicapped children. Journal of Special Education, 1981, 15, 325-332.

A case is made for the superiority of computer-based exploratory learning over traditional drill and practice techniques for teaching children with communication handicaps. The main reason for the better success of exploratory learning is that it more closely models normal communication development by allowing the child to ask and answer questions, as well as to give commands to the computer. Three computer systems based on an exploratory learning philosophy are discussed. First, is the Edison Responsive Environment, or "Talking Typewriter," which was developed in the mid-1960's for normal children. In 1973 a similar system was reported to have successfully increased social communication speech in 17 autistic children. A talking typewriter can either speak a letter or word entered by the student, or speak a letter or word and ask the child to type it. Second, the computer language LOGO is presented as a method being tested with children with various communication handicaps. The child issues commands to a "turtle" on the monitor for purposes of picture drawing. Finally, the CARIS system is discussed, whereby students learn to read by exploring the meaning of simple noun-verb sentences. After input of a noun and verb the computer displays an animated graphic of the noun doing the action of the verb.

071 Glen, I. Exploring with the microcomputer. Special education: Forward trends (British Journal of Special Education), 1981, 8(3), 16-18.

Brays School for Physically Handicapped Children in Birmingham, England installed its first microcomputer in 1979. The primary usage was to serve as a communication aid to severely handicapped students. This article provides an account of a number of experiences which staff have had with the computer and a glimpse at the program which has been built around this new addition. A number of resulting developments and issues are discussed.

072 Goldenberg, E.P. Special technology for special children: Computers to serve communication and autonomy in the education of handicapped children. Baltimore: University Park Press, 1979.

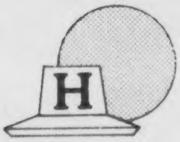
The major theme of this book is that the computer provides a flexible technology that can thoroughly enrich the experiences and communication of certain handicapped children, e.g., autistic, deaf, cerebral palsied. The author clearly takes the position that the most effective way to achieve this goal is by viewing the computer as a "prosthetic" versus a "tutorial" device. In other words, emphasis throughout the book is on how the computer can become the tool of the child instead of the tool of the teacher. Instead of the computer being used as a medium for a program designed by the teacher to lead the child through a sequence of steps to learn some desired behavior, this author views it as a prosthetic medium through which the child can explore. A discussion of the use of the computer language LOGO for exploration by handicapped children is a major focus of the book. The book is organized into the following four parts: (1) a philosophy of educating handicapped children and the role computers can play in that process; (2) the psychology and education of three groups of handicapped children, i.e, physically handicapped, deaf, and autistic; (3) computer technology; and (4) research issues concerning the usage of computers and handicapped children.

073 Grimes, L. Computers are for kids: Designing software programs to avoid problems of learning. Teaching Exceptional Children, 1981, 14(2), 49-53.

Offers a thorough discussion of special learning problems of mentally retarded and learning disabled students, as well as presenting many computer assisted instruction (CAI) design criteria to minimize the learning problems. Problem areas include selective or poor attention to relevant learning stimuli, visual discrimination of letters, response times which are too fast or too slow, short-term memory deficits, inability to transfer and generalize learning to new situations, and inability to recognize mistakes. CAI programs should highlight necessary information through visual and sound displays. Reaction time extremes can be handled individually, e.g., too fast of a response causes a STOP sign to be drawn and a warning issued to think before answering. All extraneous material must be removed to minimize short-term memory deficits. Over learning through continued repetition is also helpful in handling memory deficits. In conclusion, classroom microcomputers can provide the structure and added practice that handicapped students may need to learn academic skills.

074 Guthrie, D., Heighton, R., Keeran, C., & Payne, D. Data bases and the privacy rights of the mentally retarded: Report of the AAMD task force on data base confidentiality. Mental Retardation, 1976, 14(5), 3-7.

Presents the findings of the AAMD ad hoc committee on the Use and Construction of Data Banks in Mental Retardation. The Committee recommended that: (1) data base technology be continually developed and used; (2) six minimum conditions be met to assure confidentiality; and (3) a committee be formed to identify existing data base systems containing information about mentally retarded individuals, establish standards for operation, and to evaluate the protection of privacy within them. Other topics discussed include the use and construction of data banks; the function, use, and potential abuse of automated data systems as applied to the care of retarded persons; privacy and confidentiality; administration of data based systems; and the necessity of establishing a code of ethics to govern provision and use of data base information.



075 Haberman, E.L. Effectiveness of computer assisted instruction with socially/emotionally disturbed children (Doctoral dissertation, University of Pittsburgh, 1977). Dissertation Abstracts International, 1977, 38, 1998A-1999A. (University Microfilms No. 77-21, 221.)

Summarizes a study to investigate the effects of applying computer assisted instruction (CAI) with socially/emotionally disturbed school children. While traditional educational approaches to emotional disturbance appear to have not been effective, CAI holds the potential to minimize miscommunication problems which then lead to acting out behaviors. CAI can create an objective, fair, non-threatening approach to previously frustrating learning tasks. In this study, eighteen socially/emotionally disturbed children were matched into nine equivalent pairs and randomly assigned to one of two groups. The experimental group interacted with a math CAI program through teletype computer terminals and received immediate and consistent reinforcement. The control group students interacted with similar content in a paper and pencil format and received various types of teacher determined reinforcement. Grade gain scores, after two months, were significantly higher for the experimental group. In addition, total time and independent time on task was significantly greater for the experimental group.

076 Hall, K.A. CARE: Computer assisted renewal education. Viewpoints (Bulletin of the School of Education, Indiana University), 1974, 50(4), 65-79.

Describes the CARE program, which consists of a series of computer-assisted instruction (CAI) courses for training regular educators to teach handicapped children and two mobile CAI laboratories for delivering the instruction to in-service teachers in their community setting. The CARE curriculum is comprised of four self-contained, college level, computer-assisted instruction courses: (1) Early Identification of Handicapped Children; (2) Diagnostic Prescriptive Teaching of Preschool and Primary Children (two courses); and (3) Education of Visually Handicapped Children. These courses are offered in a 40 foot van which houses an IBM 1500 CAI system and 16 student stations. The mobile laboratory is moved to various community school settings and connected to their electric and telephone services. Course participants are said to have reported a high degree of satisfaction with the curriculum and with the method of instruction.

077 Hall, K.A., Cartwright, P., & Mitzel, H. A triumph for CAI. *Phi Delta Kappan*, 1974, *56*(1), 70-72.

Describes a mobile computer-assisted instruction (CAI) laboratory which provides in-service training to teachers on the education of exceptional children. Developed at Penn State University and inaugurated in 1970, the current system allows for approximately 1,000 educators to complete the computer-mediated program each year in their rural Pennsylvania communities. The curriculum program is titled, "Computer Assisted Renewal Education (CARE): Introduction to Exceptional Children." Upon completion of the CAI course, participants are expected to: (1) know the characteristics of handicapped children and be aware of symptoms indicative of potential learning problems; (2) be able to screen children in regular classroom programs for deviations and determine the extent of the individual differences; (3) be able to select and use appropriate commerical and teacher-constructed appraisal and diagnostic procedures to obtain more precise information concerning the nature of deviation; (4) be able to prepare individual profiles of each child's strengths and weaknesses on educational relevant variables; (5) be able to evaluate the adequacy of the information in order to make appropriate decisions about referral to specialists; and (6) be able to prepare adequate documentation of the case if the decision to refer is affirmative. To implement the program, a custom built van is fitted with 15 student work stations using an IBM 1500 Instructional System. The mobile CAI laboratory is moved to a community school for a seven week period whereby teachers, supervisors, and administrators schedule themselves for one to three hour sessions at the student stations. The CAI lab will accommodate 125 to 150 students during the seven week period for those who enroll for a typical three-credit college level course. Results of one study showed a CAI group obtained a mean score 24% higher on a final exam than did a conventionally taught group of students, and that the CAI students completed the course in 33% less time.

078 Hall, K.A., & Knight, J. *Continuing education (in-service) for teachers via computer assisted instruction: Final report* (Bureau of Education for the Handicapped). University Park, PA: Pennsylvania State University, Computer Assisted Instruction Lab, 1975. (ERIC Document Reproduction Service No. ED 111 327.)

The purpose of this project, which began in 1970 through funding from the Bureau of Education for the Handicapped, was the development of a series of computer assisted instruction (CAI) modules designed for mobile in-service training of special education teachers. Some of the products resulting from this effort include the: (1) CAI diagnostic teaching course for both preschool and primary teachers working with handicapped children; (2) a CAI simulation module designed to assess the ability of teachers to accurately identify handicapping conditions in young children; and (3) a CAI course on the education of visually handicapped children. This series of CAI courses is referred to as CARE (Computer Assisted Renewal Education).

079 Hall, K., & Mitzel, H. Interactive computer-based education for satellite application. Paper presented at the conference on Educational Applications of Satellites. Arlington, Virginia, February 2-3, 1977. (ERIC Document Reproduction Service No. ED 134 234.)

Discusses a narrow-band satellite for facilitating in-service teacher education on training mildly handicapped students. The satellite system, referred to as Computer Based Education Utility (CBEU), also can assist in the direct instruction of handicapped children. The authors present CBEU implementation plan for teachers on-the-job as well as a specific curriculum for CBEU designed to better enable elementary teachers to teach handicapped children via this computer approach.

080 Hallworth, H.J., & Brebner, A. CAI for the developmentally handicapped: Nine years of progress. Proceedings of the Association for the Development of Computer Based Instructional Systems. Washington, D.C.: April 1980. (Authors are faculty members of the Education Computer Applications Unit, University of Calgary, Alberta, Calgary, Canada.)

Describes a nine year project conducted at the University of Calgary to develop computer assisted instruction (CAI) applications for mentally retarded young adults in the areas of social arithmetic and reading. The resulting systems have been used with clients through the local Vocational and Rehabilitation Research Institute. Students use special "multi-media terminals" which include an 8080 microprocessor chip to control a Kodak random-access carousel slide projector and other special purpose communication devices. These devices were used to overcome physical handicaps (the POSSUM expanded keyboard for cerebral palsied trainees) and to simplify mental operations (touch sensitive displays). A series of studies was conducted to examine the effectiveness of different CAI courseware developed during the project. Future plans include use of videodisc to address problems in courseware.

081 Hallworth, H.J., & Brebner, A. Computer assisted learning for the mentally retarded (Part I). Calculators Computers Magazine, 1978, 2(4), 78-80.

Presents an overview of a project designed to develop a computer assisted instruction (CAI) curriculum for mentally retarded persons which was implemented at the Vocational and Rehabilitation Research Institute (VRRI) at the University of Calgary. The guiding principles of the project were that: (1) equipment be taken to the learner in his/her customary place of learning; (2) special social education training courseware be written; (3) special terminal equipment be designed and constructed; (4) a higher quality education be provided at a feasible cost; and (5) the curriculum products produced as an outcome of the project become integral to the educational program at the VRRI. Social education courseware has been developed in perceptual motor skills, money and numeric skills, prereading and reading skills, and social skills. Randomly selected positive reinforcement from the computerized system is considered to be very important to successful training of retarded persons.

082 Hallworth, H.J., & Brebner, A. Computer assisted learning for the mentally retarded (Part II). Calculators Computers Magazine, 1978, 2(5), 84-86.

This is the second of a series of two articles describing a computer assisted learning (CAL) program for the retarded at the Vocational and Rehabilitation Research Institute in Calgary. The major hardware is a CRT terminal and a slide projector located at each CAL desk. A variety of input and output devices are also available so that the computer is accessible to everyone regardless of their handicap. For example, instead of using a standard keyboard with large recessed keys, severely paralysed individuals can use a POSSUM indicator board which can be operated simply by sucking and puffing on a tube. The authors conclude through the results of a series of studies conducted at the institute that the quality of education is improved for mentally retarded persons via CAL. They also indicate how it is cost efficient in relation to conventional teacher instruction. The CAL has now become an integral part of the institute and is already being incorporated into other settings, e.g., a school for retarded adolescents and a children's hospital.

"It is extremely important that potential users know what computers can and cannot do, and what is involved by applying their considerable power to the problems of the handicapped learner." (Thorkildsen and Thomas, 6)

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083 Hannaford, A., & Sloane, E. Microcomputers: Powerful learning tools with proper programming. Teaching Exceptional Children, 1981, 14(2).

The authors list 14 ways in which a microcomputer with appropriate educational software can serve as a teacher aid. Some examples are to: (1) provide a multisensory approach to learning; (2) allow a student to learn at his or her own rate; (3) provide instant feedback; (4) give a variety of reinforcements; (5) "remember" student responses; and (6) provide diagnostic and prescriptive information to the teacher. In addition, a set of criteria is presented for use in selecting software. Specifically, an evaluation form for microcomputer software is included which contains 45 criterion items in the areas of learner/teacher needs, instructional integrity, and technical adequacy and utility.

084 Hannaford, A.E., & Taber, F.M. Microcomputer software for the handicapped: Development and evaluation. Exceptional Children, 1982, 49, 137-142.

Discusses important factors within each of three areas related to the development and evaluation of educational microcomputer software for handicapped learners. The three areas considered are: (1) educational compatibility; (2) instructional design adequacy; and (3) technical adequacy. To be educationally compatible, computer materials must be used for appropriate applications, be compatible to the needs of both the learner and the teacher, and also be compatible with the curriculum. Instructional design adequacy requires that specific goals and objectives be identified and prerequisite knowledge and skills be specified. Many instructional issues must also be addressed, such as how the material is presented, the focus of the material, mode of instruction, and how to provide reinforcement and feedback. Technical adequacy concerns such questions as whether the software uses the full hardware capabilities, if the software can be controlled by the teacher/student, and whether the software is "kid-proof." Several benefits and potential problems of microcomputers for disabled persons are also discussed.

085 Hart, B., & Staples, I. Microcomputers in special schools. Special education: Forward trends (British Journal of Special Education), 1980, 7(4), 22-25.

The authors consider the microcomputer to be the latest in the line of machines able to translate many learning principles into practice. Unlike previous efforts at programmed learning, however, the microcomputer is considered advantageous in that the material is easy to revise and update, it can be stored conveniently on disc or tape, and it can instruct the microcomputer to interact in a flexible manner with the student. Included in the article are examples of a number of ways the microcomputer has been applied in a special school: (1) investigating the important stages in the child's acquisition of numeracy skills; (2) a program which deals with amounts of money made up with various coins; and (3) a series of programs aimed at directional confusion. In conclusion, the microcomputer is considered to provide the classroom teacher with the most sophisticated analytical tool yet made available by collecting, analyzing and storing important learning data on individual students. Thus, microcomputers serve the possibility of combining teaching with dynamic research.

086 Hasselbring, T.S. Reducing the inappropriate social behavior of moderately retarded students as a function of modifying teacher interactive behavior using the computer-assisted teacher training system (Doctoral dissertation, Indiana University, 1979). Dissertation Abstracts International, 1980, 40, 3949A. (University Microfilms No. 80-00, 637.)

Summarizes a study designed to improve the social behavior of moderately retarded students. A modification of the previously developed Computer Assisted Teacher Training System (CATTS) was implemented. This system categorized teacher/student interactions and provided feedback on the interactions. Nine teacher/student dyads were selected as subjects and randomly assigned to one of three groups. The three groups consisted of a control group (no CATTS interaction) and two experimental groups. One experimental group received feedback in summary form on 15 observation sessions while the second experimental group received detailed feedback on all 15 observation sessions. An input (teacher specified behavioral goals), process (effects of CATTS), product (student behavior changes) evaluation model was employed. Results indicate that the teachers receiving detailed feedback significantly increase the amount of interaction and use of approval behavior, and that students in the detailed feedback dyads significantly decrease the amount of inappropriate social behavior.

087 Hasselbring, T.S. Remediation spelling problems of learning-handicapped students through the use of microcomputers. Educational Technology, 1982, 22(4), 31-32.

Describes the Computerized Spelling Remediation Program (CSRP), which was developed for the Radio Shack TRS-80 Model I microcomputer. The CSRP consists of three components: (1) wordlist input; (2) word presentation with feedback; and (3) performance summary. The CSRP is not bound to a specific wordlist, rather the classroom teacher can create his or her own wordlists with little difficulty. The user of CSRP can rapidly access and maintain approximately 40 individual student wordlists at any one time on a single 5¼ inch floppy disk. One of the unique aspects of CSRP is the second component which is designed to provide the student with imitation and modeling feedback without the need for adult intervention. This approach is based on research which suggests that there is an obvious advantage in imitating a student's error before presenting a correct model. The performance summary provides a number of important pieces of information, including the student's name, date and target wordlist, a list of words the student spelled incorrectly on the first try but correctly on the second, the list of words the student mispelled on both attempts, and the frequency and percent of correctly spelled words. A successful case study of a learning disabled student is briefly presented.

088 Hasselbring, T.S., & Crossland, C.L. Application of microcomputer technology to spelling assessment of learning disabled students. Learning Disability Quarterly, 1982, 5(1), 80-82.

Discusses a study to determine if the Test of Written Spelling (TWS) could be administered more efficiently via microcomputer than by its normal mode. The sample of 28 learning disabled elementary school students were divided equally into control and experimental groups. Results indicate that the computerized administration of TWS reduced examination time and scoring errors.

089 Hasselbring, T.S., & Crossland, C.L. Using microcomputers for diagnosing spelling problems in learning-handicapped children. Educational Technology, 1981, 21(4), 37-39.

Describes the Computerized Diagnostic Spelling Test (CDST), an interactive BASIC computer program, which was designed to emulate the administration and scoring procedures of the Kottmeyer Diagnostic Spelling Test. CDST, which was developed for microcomputers, consists of four components: (1) demographic data; (2) providing directions to the pupil; (3) presentation of spelling words; and (4) scoring and diagnostic summary of results. Directions to the user are both visual (printed-directions on the computer monitor) and auditory (a microcomputer driven cassette recorder).

090 Hatcher, L. Brief descriptions and sample copies of routine management reports. Salem, OR: Department of Human Resources, Vocational Rehabilitation Division, 1980 (unpublished manuscript).

Provides descriptions and samples of the reports generated by the Oregon Vocational Rehabilitation Division. Included are: (1) caseload report (listing of caseloads by rehabilitation counselors); (2) field service workload report (monitoring of progress towards performance goals); (3) managers report (monitoring of agency performance); (4) severely disabled performance report (monitoring of IWRP's and rehabilitation programs); (5) percent severe report (monitoring of percentage of clients classified as severely disabled); (6) field fiscal report (provision of information to monitor fiscal status in relation to case service budget); (7) transaction report (monitoring of expenditures and frequently selected services); (8) Worker Compensation Department report (testing of open assigned and closed assigned cases); (9) SSI/SSDI reports (listing of SSI/SSDI cases sorted by rehabilitation counselors); and (10) miscellaneous reports.

091 Hatcher, L. Client information teleprocessing system. Salem, OR: Department of Human Resources, Vocational Rehabilitation Division, 1980 (unpublished manuscript).

Describes the Oregon Vocational Rehabilitation Division's Client Information Teleprocessing System (CITPS). The CITPS system tracks clients through the rehabilitation process and provides reports for both counselors and administrators. Counselor completed forms are input into the system by their secretaries. The field information is input through more than 40 IBM Model 3275 video terminals into the central computer, an IBM Model 3032.

092 Hatcher, L. *Description of the automated data files used by the Oregon Vocational Rehabilitation Division*. Salem, OR: Department of Human Resources, Vocational Rehabilitation Division, 1980 (unpublished manuscript).

Presents a description of the computer files comprising the Oregon Vocational Rehabilitation Division data processing system. The eight files described are: (1) Client Information Teleprocessing System file (master file of client data); (2) Cost History file (authorizations for purchase and payments); (3) Facility file (services and costs provided by any facility); (4) Evaluation Center file (starting date, ending date, and services provided in evaluation centers); (5) Service Code file (dictionary of service codes); (6) Vendor file (dictionary of vendor codes); (7) Closure file (created by matching the master client file and the Cost History file to compute R-300 data); and (8) Training Vendor file (created by matching the master client file and cost information on clients in training to compute success rates of training).

093 Helmick, M.A. Attitudes of special educators toward classroom applications of computer technology, individual educational programs, and Skiltrac (Doctoral dissertation, University of Cincinnati, 1979). *Dissertation Abstracts International*, 1979, *40*, 1357A-1358A. (University Microfilms No. 79-19, 332.)

This study assessed the attitudes of special educators toward computer technology and examined the relationship of these attitudes to experimental, demographic, and professional role variables. The areas of attitude assessment were: (1) classroom applications of computer technology; (2) Individualized Educational Planning (IEP); and (3) SKILTRAC (a computer-based management system for developing IEP's). Results indicate no significant relationships between attitudes and the three variables specified. Positive attitudes, however, were found toward classroom application of computer technology and IEP's. The greatest asset of computerized IEP's involved enhancing classroom organization, while the greatest limitation was related to time consumption.

094 Hofmeister, A.M. Microcomputers in perspective. *Exceptional Children*, 1982, *49*, 115-121.

Microcomputers will make a contribution to special education when we are in a position to fully capitalize on the strengths of the technology and minimize inappropriate applications. The improvement in reliability and cost-effectiveness of hardware over the past 10 to 15 years has not been matched in software development. In fact, the author states that quality of present educational software is very disappointing. However, the future should be better as software developers are beginning to consider the implications of instructional theory and the needs of teachers to adapt curriculum easily. The greatest benefit of microcomputers for special education students will not be the currently popular drill and practice programs, but in "concept teaching" software. Six potential problem areas of microcomputers are discussed, including reading requirements of software, inappropriate mode of material presentation, and instructional fragmentation.

095 Hofmeister, A.M., & Thorkildsen, R.J. Videodisc technology and the preparation of special education teachers. _Teacher Education and Special Education_, 1981, _4_(3), 34-39.

Examines the implications of combining videodisc technology and the microcomputer for the training of special educators. Topics addressed are: (1) microcomputer/videodisc technology; (2) storage of instructional information; (3) films and videodisc in teacher education; (4) CAI programs in teacher education; (5) special education classroom practices and the videodisc; (6) communications/technology literacy for teacher education; and (7) research resources for thesis and dissertation projects. The authors state that the videodisc's ability to store massive amounts of information at a low cost will undoubtedly bring about a significant change in information storage and retrieval systems. Due to this change they advocate teacher training programs to prepare for major methodological changes in curriculm and instruction.

096 Hoffmeyer, D.B. Computer-aided instruction at the Florida School for the Deaf and Blind. _American Annals of the Deaf_, 1980, _125_, 834-840.

Describes the development since 1971 of a computer assisted instruction (CAI) curriculum in mathematics, language, and reading at the Florida School for the Deaf and the Blind (FSDB). The content strands within each area is listed and sample computer readouts of results are also shown. Results indicate that the functioning level gain for the elementary school students at FSDB increased more than the national average gain per academic year.

097 Hope, M. How can microcomputers help? _Special education: Forward trends_ (British Journal of Special Education), 1980, _7_(4), 14-16.

The Department of Education and Science in the United Kingdom funded a new government program titled "Microelectronics Education Programme for Schools and Colleges." The priorities for this program are curriculum development, teacher training, and software production and distribution. The Council for Educational Technology, of which the above author is program manager, was asked to determine the role of the new program within the field of special education. As one approach to this task, 16 basic questions are posed in this article, some of which are: (1) what are the ways microelectronics can contribute to special education?; (2) is there any evidence to show that microelectronics controlled aids can increase independence and/or enable more pupils to be integrated into ordinary schools?; (3) do the headings of teacher training, information and advice, software production, software distribution and hardware cover all the key issues about the use of microelectronics in helping children with learning difficulties?; and (4) what should be the priorities in work on microelectronic application in special education?. While answers were tentatively offered to these and other questions, the author welcomed input, especially from special education teachers.

> ***"For a physically disabled child who has limited access to the world of motion and spatial relationships, for a learning-disabled child who shows a flair for geometric problem solving, and for a nonverbal child who is blocked in establishing communication, developing a facility in using a computer can be regarded as an essential educational experience."*** (Weir, Russell and Valente, 7)

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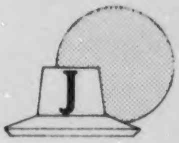
098 Howe, J. Computers: A researchers view. Special education: Forward trends (British Journal of Special Education), 1980, 7(4), 17-21.

Presents a series of computer related investigations with autistic, dyslexic, and learning disabled children conducted through the Department of Artificial Intelligence at Edinburgh University. These research activities are described as well as the framework for a teaching strategy. Several important teaching guidelines are: (1) the need for a close match between the information demands of the teaching materials and the information content of a child's mental representations should be satisfied by using familiar materials, such as toys, pictures, and apparatus, as manipulatable models or as metaphors; (2) the need to organize teaching materials so that the child can take as much initiative and responsibility for carrying out tasks as is consistent with his knowledge; and (3) the need to check what a child has done, and to suggest clues and limits about what he ought to have done when his work is wrong, should be satisfied by providing him with detailed information as direct feedback about each action.

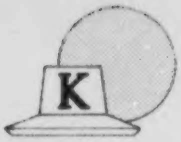


099 Johansen, R., McNeal, B., & Nyhan, M. *Telecommunications and developmentally disabled people: Evaluations of audio conferencing, personal computers, computer conferencing, electronic mail*. Menlo Park, CA: Institute for the Future, 1981.

This is the final report of a major demonstration project to show how various telecommunications media might benefit developmentally disabled children and adults. Three criteria (effectiveness, affordability, and accesibility) were established for the design and implementation of four specific applications; audio conferencing, personal computing, computer conferencing, and electronic mail. Project results were summarized as moderately successful. The personal computers application used eight adolescents and adults with cerebral palsy. The computers were adapted for each individual and then used for educational, vocational, and communication purposes. Results for each of the eight persons varied widely. Other computer related studies were of computer conferencing and electronic mail as means of linking staff at institutions for the developmentally disabled. The report ends with overall project conclusions and policy recommendations for human-service funding agencies.

100 Jung, P. New learning aids offer help for the handicapped. *Apple*, 1980, *1*(1), 22-23.

Briefly highlights three individuals and their unique contributions in the development of new electronic learning aids for cerebral palsied victims. The first case pertains to John Giem, whose son has cerebral palsy. As an engineer, he envisioned a system in which a "joy stick" could be used to control the interface with a computer and thus eliminate the need for a keyboard. The system involves an easily maneuvered stickcontrol which allows the user to build sentences on a TV screen through simple movements to the right or left. The second case regards John Watkins, a computer salesman whose daughter is also a victim of cerebral palsy. He realized the value of a personal computer in helping his daughter to communicate and learn but also recognized her inability to use a standard keyboard. As a result, he custom designed an oversized touch sensitive keyboard, measuring 15" x 18", with keys which are flat surfaces measuring 1" of spacing between them in all directions. His idea is now being implemented by an electronics company. The final case concerns Tim Scully, who has received a lot of publicity since he is doing his work as an inmate in a federal prison. He designed for a friend who has cerebral palsy a system which incorporates a personal computer and video display installed on a wheelchair. It is operated by a kneeswitch which allows for selection from the menu of items on the display screen. The experiences of these three men is intended to illustrate the flexibility of the personal computer and to inspire others to envision new ways of helping the handicapped to communicate and learn.



101 Katz, J. Special tools for special needs. *Classroom Computer News*, 1980 (Nov.-Dec.), 12-13.

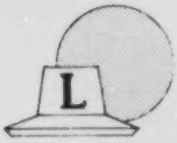
Briefly presents computer assisted instruction (CAI) applications which have been developed to meet the unique needs of deaf students at both the Learning Center for Deaf Children, and the Boston School for the Deaf. The Learning Center's computer system connects eight terminals to a PDP 11/34. Programs in math, language, and reading feature: (1) menu driven programs; (2) software written in a grammatical style consistent with the low level English skills of deaf students; and (3) the use of computer graphics and touch sensitive monitors. The Boston School has developed a prototype system to help students experiment with new vocabulary and sentence patterns. ILIAD (Interactive Language Instructional Assistance for the Deaf) allows students to choose the level of difficulty by selecting sentence type (simple vs. complex), vocabulary level, and task demands (e.g., transforming questions to declarations).

102 Killen, J.R., & Myklebust, H.R. Evaluation in special education: A computer based approach. *Journal of Learning Disabilities*, 1980, *13*, 440-444.

Discusses the need for new procedures and techniques to assess educational practices and evaluate success in learning in the total context of exceptional children and their needs. A large data based computer system developed at the DuPage/West Cook Regional Special Education Association serves 25,000 handicapped children in the Chicago area by acquiring and maintaining the necessary data files to meet these evaluation needs. Administrative reports and evaluation studies are created on the centralized computer system while the participating local education agencies use their own microprocessors to input data and fulfill their specific information needs.

103 Knutson, J.M., & Prochnow, R.R. *Computer assisted instruction for vocational rehabilitation of the mentally retarded* (Monograph #2). Austin, TX: University of Texas at Austin, College of Education, Rehabilitation RTC, 1970. (ERIC Document Reproduction Service No. ED 044 039.)

Traces the conception, development, and results of a project initiated by the Research and Training Center and the computer assisted instruction (CAI) laboratory at the University of Texas, Austin. The purpose of the project was to transform a traditional instruction program into a CAI program and to evaluate its effectiveness. Information is provided on: (1) the background of vocational rehabilitation; (2) mental retardation; (3) research in curriculum and instruction; (4) advantages of CAI such as flexibility, immediate feedback, branching techniques, individualization, reports of student progress, and use of audiovisual input; (5) courseware development strategies; and (6) evaluation of the CAI package. Results of a quasi-experimental design indicate that there were statistically significant gains from a pretesting to a posttesting situation on a program designed to teach basic math skills.



104 Lally, M. Computer-assisted teaching of sight-word recognition for mentally retarded school chidlren. *American Journal of Mental Deficiency*, 1981, *85*, 383-388.

Details the results of a quasi-experiment conducted in Australia to evaluate the effectiveness of a sight word recognition computer assisted instruction (CAI) program. Sixteen mentally retarded students were randomly selected and then divided into two groups of eight, which were matched for IQ, age, and initial sight vocabulary level. One group received the CAI program as a supplement to regular instruction while the other group received regular instruction only. CAI students were exposed to computer interaction for four weeks, four times a week, for 20 minute sessions. Keyboard input consisted of a special keyboard overlay with target words printed on it. A computer operated speech synthesizer provided instructions and spoke target words while a word list was displayed on a CRT terminal. Students responded by pushing the matching word on the keyboard overlay. Feedback was provided visually through a CRT terminal and verbally by a voice synthesizer. Results indicate that the CAI group made significantly greater gains than the control group.

105 Lavine, R.A. Education and rehabilitation for the handicapped with personal computers. In *Personal computers serving people: A guide to human service applications*, Washington, D.C.: Hawkins & Associates, Inc., 804 D Street, N.E., 1980.

Describes three uses of computer technology with special education students: (1) assisting communication with special input devices; (2) assisting communication with interactive programs; and (3) teaching learning disabled children. Special input devices described are enlarged keyboards, control sticks, knee operated switches, eye movement controls, and lap tray devices. These input devices are useful for handicapped children with physical impairments who have normal functioning cognitive abilities. For cognitively impaired children or children who lack motivation in respect to communication, interactive programming may provide a learning stimulus. Several advantages are given for using computers with learning disabled children, i.e., immediate reinforcement, programming for success, frequent practice, and maintaining interest and interaction.

106 Lawrence, P., & Horne, S. Input modes: Their importance in the clinical application of electronic aids for disabled persons. Archives of Physical Medicine Rehabilitation, 1979, 60, 516-521.

Presents results of a study designed to compare 12 different programmed input modes to allow physically handicapped persons to operate an environmental control aid. Fourteen disabled and 10 non-disabled persons used the Modular Environment Control aid (MECON) to test the speed and accuracy of the different modes of input. Conclusions include: (1) a wide range of transducers (e.g., switches, joysticks) and input modes (i.e., the way the transducer produces control commands) are optimal in an electronic aid; (2) patients prefer self paced modes to avoid having to "keep up" with the device; (3) the fit and stability of the transducer for each individual is very important; and (4) results for nonhandicapped persons are not applicable to those of handicapped persons.

107 Lehrer, B.E., & Daiker, J.F. Computer based information management for professionals serving handicapped learners. Exceptional Children, 1978, 44, 578-585.

Reports on the use of a computer based information management system to assist special educators in Ohio to develop educational programs. Major areas of discussion are: (1) the computer and the Individualized Education Plan (IEP) development process; (2) development and description of Ohio's Handicapped Education Learners Planning System (HELPS); (3) accessing information from HELPS; (4) sampling HELPS' wares; and (5) field testing of Ohio's HELPS. HELPS is an interactive system designed to store and retrieve educational objectives, instructional activities and materials, teaching competency information, and supportive information. Information from 32,000 resources is stored on a CDC-6400 computer at the Batelle Memorial Institute. HELPS provides information relevant to specified student characteristics. Nine hundred special educators, parents, and professionals have used and provided feedback on the system. They indicate that HELPS enhances decision-making and increases awareness of available materials, but that additional training on the system is needed to assist, interpret and apply the instructional and curriculum resources identified.

108 Leotti, G. Computing techniques for the handicapped. Compute, 1982, 4(7), 94-95.

A quadriplegic presents several helpful hints for the operation of electronic equipment (e.g., personal home computer, tape deck) by other similarly disabled persons. As one example, he noted how it was initially impossible to turn on the power switch in his PET Commodore due to its location in the back. As a result, he obtained a toggle switch (Radio Shack part number 275-657) which now "jumps" the power to the new accessible switch. An additional suggested solution would be to have installed a single switching center. Other manipulative problems such as pushing the PLAY and RECORD keys at the same time on the tape deck and removing the tape cassette are briefly mentioned and helpful solutions offered.

109 Lerner, J.W., & Schuyler, J.A. Computer applications in the field of learning disabilities: Preparation of personnel in the education of the handicapped. Department of Communication Disorders, School of Speech, Northwestern University, Evanston, Illinois. (ERIC Document Reproduction Service No. ED 071 225.)

The purpose of this project was to develop and implement interactive computer programs designed to simulate the diagnostic and clinical teaching processes to teachers who were learning disabled specialists. Sixty-eight trainees who participated in the simulation course reported favorable attitudes toward this method of instruction.

110 Lerner, J.W., & Schuyler, J.A. Computer simulation: A technique for training educational diagnosticians. Journal of Learning Disabilities, 1974, 7, 471-476.

A computer simulation on the diagnostic process was developed and incorporated into a graduate course in the diagnosis of children with disabilities at Northwestern University. This computer approach to clinical training was an attempt to duplicate certain activities of a system and thus bridge the gap between theory based courses and the actual clinical experience. Sixty eight students preparing to be learning disability specialists participated in the use of this diagnostic decision-making simulation model. A student attitude scale indicated that 94% of the students thought the computer simulation was a useful technique of training. Specifically, they commented that the simulation: (1) required them to make decisions concerning tests, information needed from other professionals, and time allotments; (2) created a realistic face-to-face staffing situation; (3) forced them to organize the data to develop hypotheses; and (4) permitted them to compare their decisions with the decisions made by other diagnostic teams.

111 Levitt, H., Slosberg, R., Hawie, D., Mazor, R., & Rosenstein, M. Computer-based techniques for enhancement of clinical techniques. Journal of American Speech and Hearing Association, 1978, 20, 398-402.

Describes the Computer Assisted Audiological Instruction (CAAI) system developed to provide training in diagnostic decision making for speech and hearing students. CAAI was developed at the City University of New York on an IBM 360 in the FORTRAN programming language. Each of three subsystems is described from both the student operation level and the teacher operation level: (1) the Diagnostic Test Battery system simulates an entire test battery to teach students the specifics of the tests and why they are important; (2) the Threshold Testing system provides experience in handling unanticipated responses from patients; and (3) the Videorecording system, which is not complete, shows clinicians, instructors, and patients in different clinical environments.

112 Levy, J., & Pinder, S. Computer assisted management of state school waiting lists and admission procedures. Mental Retardation, 1971, 9(5), 30-34.

Presents the rationale and procedures for implementation of a data base system to manage waiting lists and admissions to state residential schools for the mentally retarded in Texas. The objectives for the system are improved care through expansion of rapid placement opportunities, effective utilization of school resources, and effective planning and management of state programs. The system provides: (1) storage and retrieval of applicant data; (2) assignment of living units based on a match of client needs and living unit characteristics; and (3) a selection index of applicants for admission based on date of application, distance between home and school, and an index of placement urgency. Several routine monthly administrative reports are also discussed.

"Low cost computing technology promises unprecedented new vocational and educational opportunities for the developmentally disabled." (Hazan, 8)

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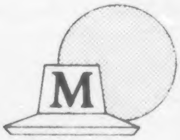
113 Luyhen, P.D. The effects of pictures on the acquisition of a sight vocabulary in rural EMR children. Tallahassee, FL: Florida State University, Computer Assisted Instruction Center, 1973. (ERIC Document Reproduction Service No. ED 074 752.)

Presents the results of a study designed to investigate the effects of pictorial representation of words on the acquisition of sight vocabulary of emotionally and mildly retarded children. Eleven special education students were randomly assigned to a word-word matching (w-w) group and 11 were assigned to a word-picture matching (w-p) group. Computer assisted instruction (CAI) lessons consisted of the presentation of a printed stimulus word and 2-4 response alternatives. The response options for the w-w group were printed words while the options for the w-p group were pictorial representations. Results indicate that there were significant gains in the w-p group at post treatement evaluation. It was concluded that the gains are related to the use of pictorial representation of words in teaching sight word vocabulary acquisition.



114 Macleod, I., & Overheu, D. Computer aided assessment and development of basic skills. The Exceptional Child, 1977, 24(1), 18-35.

Summarizes a project designed to apply computer techniques to the assessment and development of basic skills in mildly mentally retarded individuals. This project was jointly conducted by the Department of Engineering Physics at Australia National University and the Woden School. Developmental areas investigated were: (1) language; (2) perceptual and sensory-motor; (3) short-term memory (spatial and linear sequencing); (4) spatial, temporal, and numerical relationships; and (5) attention span. Special communication devices discussed include a touch panel video terminal used in conjunction with a random access Kodak carousel slide projector to test concept acquisition. Also, an 8 row by 8 column "button box" was used to assess hand-eye coordination. Finally, a DIGIVUE dot-matrix panel consisting of 512 rows by 512 columns aided in the development of hand-eye coordination and writing skills.

115 Madachy, J.L., & Miller, J.D. The role of CAI and videotapes as instructional supplements to an English language program for the hearing impaired. Proceedings of New Directions in Educational Computing. Dallas, TX: March, 1978. (ERIC Document Reproduction Service No. ED 160 085.)

Relates information on the experiences of Gallaudet College in creating and using computer assisted instruction (CAI) with videotape to improve the English language skills of the hearing impaired. Approximately 350 students a term use 10 CRT terminals to access a DEC 1040 computer. The interactive CAI system consists of 200 lessons based on an English-as-a-second language format. This course is used as a supplement to traditional instruction by providing drill and practice in the structure of English. Key components of the program include: (1) randomized core lessons (i.e., each student is given a different pool of 30 tasks); (2) reading instruction in six skill areas (i.e., sequencing, detail, main ideas, inference, contextual cues, and drawing conclusions); and (3) vocabulary instruction (i.e., drill and vocabulary development).

116 Martin, E. Microcomputer applications to special education administration. Forum, 1980, 6(4).

This is one of 13 articles in a special issue which addresses high school programs for students with special needs. The publication places special emphasis on programs offered in New York State. The address for the Forum is 582 Baldy Hall, SUNY/Buffalo, Amherst, New York, 14260.

117 McConnell, B. The handicapple: A low cost braille printer. Creative Computing, 1982, 8(10), 186-188.

Describes an effort at Florida State University to create a low-cost braille computer terminal by combining an Apple II with an IBM Braillewriter and a Dynatyper by Rochester Data, Inc. The dynatyper is a solenoid driven array of plastic plungers developed to sit above the keyboard of a standard typewriter. The braillewriter is an IBM office typewriter converted to type in braille. The two were combined and the dynatyper software was modified to incorporate an alternate character set for Braille.

118 McGuire, G.M. The development of a computer-assisted vocational guidance system for use in rehabilitation counseling (Doctoral dissertation, West Virginia University, 1981). Dissertation Abstracts International, 1981, 42, 1012A. (University Microfilms No. 81-18, 393.)

A study designed to develop a computerized vocational guidance delivery system based on a vocational abilities test and an occupational interest level. Components of this study include: (1) establishing test selection criteria; (2) selection of the appropriate instruments; (3) field evaluation of selected tests; and (4) construction of the computerized system. Through examination of vocational rehabilitation practices, a literature review, and observation of practitioners, the California Occupational Preference System (COPS) and the Career Abilities Placement Survey (CAPS) were selected for implementation into the system. Field tests reveal that these instruments are easily administered and interpreted and useful to both rehabilitation counselors and clients for furnishing vocational choice alternatives.

119 Microcomputers and the handicapped. Byte (special issue), 1982, 7(9).

This special issue contains seven articles, the titles of which are: (1) Computers Can Play a Dual Role for Disabled Individuals; (2) A New Horizon for Nonvocal Communication Devices; (3) Minspeak; (4) Talking Terminals; (5) Braille Writing in Pascal; (6) Adaptive-Firmware Card for the Apple II; and (7) Logo: An Approach to Educating Disabled Children.

120 Microcomputers' place in special education. Exceptional Children (special issue), 1982, 49(2).

This special issue contains 11 articles, the titles of which are: (1) Computers and Education for Exceptional Children: Emerging Applications; (2) Applications of Microcomputer Technology to Special Education; (3) Microcomputers in Perspective; (4) Microcomputers in Special Education: Promises and Pitfalls; (5) The Microcomputer and Special Education Management; (6) Microcomputer Software for the Handicapped: Development and Evaluation; (7) Computer-Administered Bilingual Language Assessment and Intervention; (8) Cameo: Computer-Assisted Management of Educational Objectives; (9) Applications of Microcomputers in the Education of the Physically Disabled Child; (10) Making the World Work with Microcomputers: A Learning Prothesis for Handicapped Infants; and (11) ARC-ED Curriculum: The Applications of Video Game Formats to Educational Software.

121 Milich, M. Apples that see, hear, and touch for people who can't. Softalk. February 1982, 54-60.

Provides case studies of three Apple users who have developed innovative software packages to meet the unique needs of handicapped persons. Roy Bonnell of Florida State University led an effort to connect a vibrating platform to a musically programmed Apple microcomputer which allows deaf people to feel the music and dance to the beat "heard" through their feet. Plans include expanding the platform into an entire studio that would enable deaf students to major in dance. Gary Kelly and David Ross of Georgia Tech have developed a tonal alphabet that substitutes musical tones for letters and numbers. It is reportedly easier to learn than Braille and holds promise of developing reading speeds nearly equal to the average sighted reader. Interestingly, the tonal alphabet was designed such that common expressions take on a recognizable tune, e.g., "this is" corresponds to the first six notes of the Entertainer. Finally, an Apple program is discussed which allows a muscular dystrophy student to control the computer keyboard by turning a knob on a game paddle. Dale Westlake of Rancho Palos Verdes, California developed the program to overcome the lack of strength and agility needed to operate a common keyboard.

122 Mothner, H., & Shawn, J. Microcomputers are "Macrocontributors" to special education programs. American Annals of the Deaf, 1982, 127, 449-451.

A project was initiated in 1979, using P.L. 94-142 funds to purchase 18 microcomputers for use at three schools for the deaf and hard of hearing in the Los Angeles County Schools. The purpose of the article is to provide an overview of this project, with particular emphasis on how it has been introduced and implemented in a secondary program for the hearing impaired. Several problems were encountered in this project and the authors indicate how educators who wish to introduce similar projects should be aware of these problems: (1) programs specifically suited to a special education population are currently unavailable commercially; (2) the expense of repairing and maintaining the microcomputers must be included in the project budget; and (3) effective implementation requires one staff person at each site to assist in inservice, staff developments and program development. Some of the many benefits of the project were: (1) many students seem to be more motivated when working with the microcomputers; (2) teachers can devote more class time to slower learners while other students work at their terminals; (3) greater emphasis is placed on individualized instruction; (4) immediate reinforcement of correct responses is possible; (5) students are placed in more appropriate academic classes because of computer-administered evaluation; and (6) a special class in computer programming established at the high school level provides interested students the opportunity to explore a career in computer programming.

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123 Nave, G., & Browning, P. Preparing rehabilitation leaders for the computer age. *Rehabilitation Counseling Bulletin*, in press.

Computer technology has become increasingly important in the lives of handicapped persons and in the work world of rehabilitation professionals. This article is intended to encourage rehabilitation educators to take a major role in preparing future leaders to interface with this technology. An introductory curriculum consisting of two courses is presented as one step in this direction.

124 Nazzaro, J.N. Innovation in teacher training: A conversation with Melvyn I. Semmel. *Education and Training of the Mentally Retarded*, 1976, *11*, 352-360.

Dr. Melvyn I. Semmel has been director of the Center for Innovation in Teaching the Handicapped (CITH) at Indiana University since 1971. In 1976, CITH was honored at the 14th annual conference of the National Society for Performance and Instruction and presented the Outstanding Organization Award for its innovative and productive output of computerized methods and materials for training teachers of the handicapped. In this conversation, Dr. Semmel addresses a number of questions, e.g., What kind of research and development projects are the people at CITH working on?; What has been the Center's focus regarding instructional materials?. In response to these and other questions, he provides the interviewer with an overview of the computerized teacher training laboratory system.

125 Nelon, E.M. *An evaluation of computer assisted vocabulary instruction with mentally retarded children.* Syracuse, NY: Syracuse City School District, 1972. (ERIC Document Reproduction Service No. ED 090 964.)

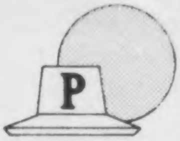
Presents results of a study investigating the feasibility of using computer assisted instruction (CAI) with elementary EMR students. Subjects for the study included 12 EMR students and 12 normal functioning students judged to be equivalent in mental age and developmental level. The experimental group, consisting of both EMR and normal functioning students, participated in a CAI presentation of vocabulary drill. All subjects were administered a post-test measure of vocabulary skill. Results indicate there were no significant differences between normal functioning students and EMR students in terms of learning, error rate, nor time necessary to complete the programmed materials. Also, significant differences were found between post-test scores of experimental and control group subjects.

126 Nickerson, R.S., Kalikow, D.N., & Stevens, K.N. Computer-aided speech training for the deaf. Journal of Speech and Hearing Disorders, 1976, 41(1), 120-132.

A computer-aided speech system was developed to train the deaf via use of nonauditory displays of speech parameters, e.g., amplitude. The system is used both in tutorial and unsupervised drill sessions. The two common exercises are: (1) vocal gymnastics, in which the student practices such activities as sustaining certain vowel or consonant sounds, producing simple nonsense syllables or sequences of such syllables; and (2) production of meaningful utterances of various lengths, selected to contain the speech gestures of interest. The system is built around a minicomputer, the Digital Equipment Corporation PDP-8E. Speech information is obtained via a miniature accelerometer attached by double-stick tape either to the throat or the nose and a voice microphone. The four programs that have been developed for presenting the display are described. Forty students have received training from the system at the Clarke School for the Deaf in Northampton, Massachusetts. In addition to the training function of the system, its usage is now extended to diagnosing speech deficiencies, evaluating training effects, and collecting normative data regarding the characteristics of the speech of both deaf and hearing persons.

127 Nocerino, J.T., Ball, J.R., Lorton, P., Borakove, R., Hanley, R.J., Hendel, A.J., McCarthy, P.A., & Ringewald, B. Interactive television: A pathway to futures in special education using telecommunication. Paper presented at the World Congress on Future Special Education. Stirling, Scotland: June-July 1978. (ERIC Document Reproduction Service No. ED 157 334.)

Describes a system which combines computer assisted instruction (CAI), cable television, and multi-media equipment to provide interactive instructional programs to handicapped children at home as well as in schools. A description of Human Resources Interactive Television Program (HR-INTEL) is provided as well as preliminary results and future program development plans. Preliminary results indicate increased: (1) opportunities for drill and practice; (2) self-confidence and independence; (3) reading and following of instructions; (4) motivation for learning; and (5) student awareness of the potential of technology in their lives. Future plans include expanding storage capacity, outreach, applications, and further experimentation.



128 Personal computers for the physically handicapped: A resource guide. Apple Computer Inc., 10260 Bandley Drive, Cupertino, California, 95014.

The resource guide was produced by Apple Computer Company to provide basic information about personal computer applications for the handicapped. The Guide highlights some unique personal computer products for the handicapped which have recently emerged and provides sources for obtaining further information in this area.

129 Personal computers help the handicapped. Creative Computing, 1982, 8(3), 54-55.

Reported are the top three prize winners of the Johns Hopkins University First National Search for Application of Personal Computing to Aid the Handicapped. The first prize of $10,000 went to Dr. Harry Levitt, professor of speech and learning at the City University of New York, for his Portable Telecommunicator for the Deaf. This programmed TRS-80 Pocket Computer provides for rapid communication by the deaf over public telephone lines. Messages stored in the pocket computer memory can be transmitted instantly or the user can send a message via the keyboard. The second prize of $3,000 was awarded to Dr. Mark Friedman, a research engineer at Carnegie-Mellon University in Pittsburg, Pennsylvania, and his colleagues, who developed an Eye-Tracker for Communication by severely disabled persons. This system allows non-vocal persons to express words and sentences up to four words long audibly by viewing them on a screen. The sequence is triggered by an infrared camera which associates the look in the eyes with the words one wants to vocalize. The third prize of $1,500 went to Robin L. Hint of St. Louis, Missouri, who developed a Lip-Reader Trainer. This aids the training of lip readers by converting typed sentences into displayed animated mouth movements. Seven other inventors who received honorable mention awards are also cited and their applications briefly discussed.

> ***"The advent of relatively low-cost microcomputers has provided a new and potentially powerful tool for the rehabilitation field. Although there are many situations in which microcomputers are not applicable, they can provide flexible, cost-effective solutions to a wide range of problems faced by handicapped individuals."***
> (Vanderheiden, 9)

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130 Powers, J.R. Computer-assisted individualized educational programming. Columbus, OH: Battelle Memorial Institute, Columbus Laboratories, 1976. (ERIC Document Reproduction Service No. ED 134 217.)

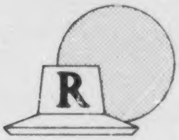
Addresses the issue of using data base management systems to develop IEPs for handicapped school children. The IEP process is defined and a hypothetical case is traced through the process. Two types of problems have resulted from federal mandate to develop IEPs. First, there are problems related to the professionals involved, e.g., competency level managerial skills, communication skills. Secondly, problems such as lack of time or insufficient data are often amenable to computer solution. Problem solving functions that a computerized data base system can perform are record-keeping, selection of assessment instruments, sorting of assessment instruments, selection of educational goals and objectives, identification of instructional activities and resources, preparation of assessment criteria, and IEP management. Several functioning systems are briefly described, including the Child Information Management System, the Children's Early Education Developmental Inventory, the Handicapped Education Learner's Planning System, and the Directive Teaching Information Management System.

131 Proceedings of the Johns Hopkins First National Search for Applications of Personal Computing to Aid the Handicapped. The Institute of Electrical and Electronics Engineers, Inc., 1981. Order from IEEE Computer Society, P.O. Box 80452, Worldwide Postal Center, Los Angeles, California, 90080.

This 303 page book contains abstracts of 97 top regional entries in the national search for new applications of microcomputers to aid handicapped persons. The abstracts are organized into five sections by handicap category, although many entries have potential application across several handicapping conditions. The sections are: (1) hearing, speech and language; (2) learning disabilities and mental retardation; (3) movement, neuromuscular and neurological; (4) vision; and (5) non-specified. A list of regional prize winners and an author index are also included. The competition was co-sponsored by Radio Shack, Johns Hopkins University, and the National Science Foundation.

132 Propp, G., Nugent, G., & Stone, C. Videodisc update. American Annals of the Deaf, 1980, 125, 679-684.

Describes the Media Development Project for the Hearing Impaired (MDPHI) at the University of Nebraska which has been involved in the design and production of videodisc programs for the deaf since December 1978. The first disc developed was a junior high social studies lesson on Israel. The second is entitled "Words in Motion" and is a one hour program to help hearing adults to learn how to read fingerspelling. The third disc is entitled "By Yourself" and is intended to provide a positive reading experience by using visuals to aid comprehension of several stories included on the disc. This avoids the common habit of rewriting literature to a lower reading level for deaf students. Other discs produced or in production include a videodisc demonstration program, a parent education program, and a research disc. Evaluation results indicate both teachers and students respond favorably to the use of the microcomputer controlled videodisc programs. A Radio Shack TRS-80 computer is interfaced with the MCA DiscoVision 7820 industrial videodisc player for the MDPHI system.



133 Ragan, A.L. The miracle worker: How computers help handicapped students. *Electronic Learning*, 1982, *1*(3), 57-83.

Describes how microcomputers are playing an increasingly important role with handicapped individuals, both in the educational and vocational areas. Their versatility is allowing the non-vocal to communicate, the blind to see, and the immobile to operate appliances.

134 Ragghianti, S., & Miller, R. The microcomputer and special education management. *Exceptional Children*, 1982, *49*, 131-135.

Presents an overview of several important considerations of microcomputers for special education administration. Five components of good data collection and information management are listed. Also, many examples are given of information needs in special education administration which computers can better serve than hand systems. Hardware and software selection criteria are discussed within the basic principles of a system design approach. The authors recommend that a total management system should be a long term goal. Thus, it is best to start with implementation of simple applications which lead to future developments.

135 Rahimi, M.A. Intelligent prosthetic devices. *Computer*, 1981, *14*(1), 19-23.

Discusses three different types of electronic communication aids developed to produce artificial speech and printed documents for severely physically disabled persons. The operation of any device is dependent upon the users ability to control an activating mechanism through biological signals which can be detected by the computer. The three types of aids are: (1) joystick-operated communication aids; (2) a talking Blissymbol board; and (3) single-switch operated communication aids. The single-switch aid can be activated by minimal body movement for those disabled persons unable to manipulate a joystick. Experimentation is also being conducted on electrode implantation or surface placement so that impulses to activate a single switch can be transmitted in this manner.

136 Ramey, R.L., Aylor, J.H., & Williams, R.D. Microcomputer-aided eating for the severely handicapped. Computer, 1979, 12(1), 54-61.

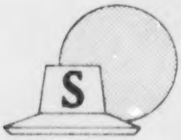
Describes a prototype system using a microcomputer to direct the movement of a specially designed manipulator which permits quadriplegics to eat independently. The system was based upon four design specifications: (1) the control computer should be portable and able to fit on a wheelchair using the wheelchair battery for power; (2) all hardware should operate from one power source and be simple to install; (3) software should be developed to allow the computer to "learn" different movement patterns; and (4) the computer system should be expandable. The feeding cycle begins with the feeding utensil in the rest position until the Intel 8080 microprocessor receives a signal from a switch triggered by a shoulder, neck, or head movement. The manipulator then moves in a programmed path from the rest position to the plate where the utensil moves in a "search" pattern. The user stops the search when the utensil is positioned next to the desired bite of food. The manipulator then exerts a program to scoop up the food, and another program to move the utensil from the plate up to the mouth. Once the food is eaten, the user signals the computer and the manipulator moves the utensil back to the beginning rest position. The hardware and software design of the system is flow charted and explained in detail.

137 Richardson, W. Computer support to instructional management - Instructional system in mathematics: A model. American Annals of the Deaf, 1978, 123, 712-722.

Over the past decade and a half educational technologist have applied computer technology to nearly every segment of the instructional continuum in public schools, e.g., CAI-tutorial dialogue, drill and practice, computer managed instruction. The two major conclusions drawn from those efforts are: (1) most of the individual applications of the computer have validity in the learning environment and only await the solution of issues such as cost and curriculum for greater utilization; and (2) few installations, if any, have been able to assemble the necessary resources and talents to demonstrate the total benefits served from combining all the valid instructional activities into a single comprehensive system. The major purpose of this paper is to describe the comprehensive application of computer technology to instructional management with special emphasis on classroom management. Secondly, an operational classroom management system is described in one basic skill area, mathematics, in order to demonstrate by example the nature of a comprehensive management system. In summary, the paper attempts to provide the reader with sufficient knowledge concerning instructional classroom management systems so that those interested in the education of the deaf might pursue available systems for adaptation and use with hearing-impaired students.

138 Rieth, H.J., & Semmel, M.I. The use of microcomputer technology to prepare and to enable teachers to meet the educational needs of handicapped children. Teacher Education and Special Education, 1979, 2(2), 56-60.

Discussed is the use of microcomputer technology in helping to meet the requirements of P.L. 94-142, especially with respect to individualized program planning. The computer systems presented to serve this purpose are computer based education programs, computer managed instruction programs, and computer mediated assessment of videotaped instruction.



139 Samuels, M., & Minick, B. A computer managed instructional program for teachers of learning disabled students. Proceedings of the Association for the Development of Computer-Based Instruction. Washington, D.C.: March-April 1980. (Authors are employed at Allegheny Intermediate Unit, Exceptional Children's Program, Pittsburgh, Pennsylvania.)

Identifies critical aspects of a data base resource information system for teachers of learning disabled students. The system was developed to perform three functions: (1) provide teachers with lists of teaching techniques and instructional materials appropriate for individual student needs; (2) identify the location of listed material; and (3) designate other students in the class for which the techniques and materials would be appropriate. Teachers using the system are required to input basic assessment information and update student records as appropriate. The computer matches student information with materials and techniques filed in the data bank. Based on initial assessment information, the system generates part of the student's Individual Education Plan (IEP). In addition, the system generates four to six progress reports per year, which are matched directly to the IEP's.

140 Sandals, L.H. Computer assisted applications for learning with special needs children. Paper presented at the American Educational Research Association. San Francisco, CA: April 1979. (ERIC Document Reproduction Service No. ED 173 983.)

Briefly summarizes a project designed to: (1) investigate the effectiveness of computers as a resource tool with special education students; (2) study this use of computers longitudinally over five years; (3) develop curricular materials in math, language arts, and social skills; and (4) investigate innovative applications of microcomputer technology in CAI. Subjects included physically disabled, deaf, mentally retarded, and learning disabled students from elementary, secondary, and college level. Approximately 225 CAI drill and practice and tutorial programs were developed or obtained for use in the project. Various research designs were used to evaluate the effect of CAI on various dependent measures. Results are summarized as indicating that CAI has an extremely positive effect.

141 Sandals, L.H. Computer assisted learning for the future: Some practical considerations for research, especially with children and adolescents who have handicaps and/or learning problems. Programmed Learning and Educational Technology, 1975, 12, 299-305.

Discusses the practical considerations of setting up and conducting research in computer assisted learning, especially for handicapped children. The discussion is divided into five areas: sample, computer hardware, CAI software and courseware, procedure and implementation, and costs. Problems associated with sampling procedures of past CAL research include small numbers in the sample and the lack of adequate descriptions of the sample. This reduces the ability to generalize results to new samples. A major hardware decision is whether to purchase equipment or to rent or lease. Also, handicapped learners require additional apparatus to be able to use the computer system. Software problems include the lack of compatibility of programs written in many different computer languages. A large decision required of the researcher is what type of programs to be developed, e.g., drill and practice, simulation, tutorial. Scheduling, staffing, length of study, and type of assessment are a few implementation concerns which must be answered. Finally, CAL is costly, but if viewed as an institutional technique for handicapped children it can be justified as cost effective.

142 Sargent, D., & Nyerges, L. A system for the synchronization of continuous speech with printed text. American Annals of the Deaf, 1979, 124, 530-535.

Describes the Speech/Text Synchronization System (STSS) developed at the National Technical Institute for the Deaf. It can combine a speech signal with its correspondig printed text in a variety of predetermined formats. The purpose of the system is to assist prelingually deaf persons to better internalize the English language. The STSS consists of two components: the synchronization programs and the glossynograph. The synchronization programs segment the text and speech into syllables or syllable-like units and synchronize the beginning of each syllable in the printed text with its corresponding syllable in the spoken material. The glossynograph is the device used to combine the speech and printed text. It can present the synchronized material directly to the student or send the lesson output signal to videotape for recording. Preliminary results of the STSS indicate that many of the deaf students are able to perceive the degree of synchronization between an audio signal and its corresponding text.

143 Schneider, W., Schmeisser, G., & Seamone, W. A computer-aided robotic arm/worktable system for high-level quadriplegics. Computer, 1981, 14(1), 41-47.

A robotic arm and worktable system developed at Johns Hopkins University for quadriplegics retaining full range head or neck control is described. Activation of the system is completed through manipulation of a mouthstick. Various uses, hardware requirements, and software features are also described in detail. All equipment and materials used in the system are located on a worktable. The robotic arm can locate, manipulate, and position reading materials, a typewriter, typewriting paper, a telephone, self-feeding equipment, and a personal computer. Implementation of this system results in an increased level of independence for high level quadriplegics.

144 Schnitker, K., & Boeker, K. Assuring accountability in residential self-help skills program. Mental Retardation, 1978, 16, 300-307.

Describes a computerized information system developed for institutional use to: (1) provide continuous feedback on mentally retarded students' responses to teaching; (2) establish a staff accountability procedure on teaching; (3) improve teaching consistency by monitoring staff/student performance and giving feedback; and (4) document compliance with the ICF-MR regulatory standards as they address student training. A modification of the system is being developed for group homes. Client responsiveness to training is recorded daily by morning and evening staff on a specially designed client data sheet. The ward change assigns pairings between each client and a staff member daily through another sheet. Each week the client data is keypunched, computer analyzed, and output in student progress notes. Two additional summary reports generated are attendant-teacher performance and student collective response to training.

"The relevant question today is not whether they (computers) will be used to help solve instructional and communication problems of the handicapped but rather how they will be used and how they will affect the education of the handicapped in the next decade." (Watson, 10)

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145 Schwejda, P., & Vanderheiden, G. Adaptive-firmware card for the Apple II. Byte, 1982, 7(9), 276-314.

Presents technical details of a low-cost adaptive-firmware card that can be placed in an Apple II microcomputer to provide alternative input techniques for physically disabled individuals. This firmware care provides 10 separate input modes from which the user can select in conjunction with other programs without requiring that the software be altered. The 10 modes are normal keyboard, one-switch scanning, step scanning, inverse scanning, morse code 1, morse code 2, assisted keyboard, parallel, serial, and expanded keyboard. Special options include slowdown, paddle, paddle speed, and stop time.

146 Scully, T. Microcomputer communication for the handicapped. *People's Computers*, 1978, *6*(5), 34-39.

Describes a special wheelchair mounted communication system developed by the author, an inmate of a federal penitentiary, for a young girl with cerebral palsy. A 16 line TV display is used for output. The bottom 14 lines are used to store the message as it is written and the top line displays menu items one at a time for a predefined length of time. The user makes a selection by hitting a kneeswitch mounted on the wheelchair. The menu can cycle through the alphabet in SPELLING mode or through 1,200 words in word mode. This large vocabulary is accessed through a process of displaying the first and last words of alphabetized groups of words. Each group is displayed one at a time for a programmed length of time. The user hits the kneeswitch when the group containing the desired word is listed. The process is then repeated for subgroups of the chosen group until finally all words within the subgroup are listed one by one. The hardware and software designs of the system are presented in some detail.

147 Semancik, S., & Curtis, M. Micros with the handicapped: Developing a communications program (Part II). *Compute*, 1982, *4*(6), 94-98.

This is the second of a series of articles regarding the use of microcomputers as a method of communication for non-verbal, motor impaired individuals. The purpose is to identify some of the considerations in the selection of a menu for a communications program. Some of the important areas discussed include: (1) type of communication; (2) format of message; (3) format of menu; and (4) display of menu. In addition, the reader is provided a demonstration program which is applicable to the screens of three computers, i.e., Commodore PET (25 lines of 40 characters each); Commodore VIC (23 lines of 22 characters each); and Apple II (24 lines of 40 characters each). The demonstration program allows for daily communication with other people.

148 Semmel, M.I. *The effectiveness of a computer-assisted teacher training system (CATTS) in the development of reading and listening comprehension instructional strategies of preservice special education trainees in a tutorial classroom setting: Final report* (Bureau of Education for the Handicapped). Bloomington, Indiana: Indiana University, Center for Innovation in Teaching the Handicapped, 1976. (ERIC Document Reproduction Service No. ED 162 467.)

The purpose of this project, which was funded by the Bureau of Education for the Handicapped, was to develop computer assisted instruction (CAI) for the preservice training of special education teachers. The major outcome of this effort is the *Computer Assisted Teacher Training System* (CATTS) designed to provide continuous and immediate feedback to special education students in training. CATTS is a comprehensive system which produces systematic observation, real-time analysis, storage, and feedback of specific observation coding-data relevant to special education classroom teacher-pupil interaction.

149 Semmel, M.I., Varnhagen, S., & McCann, S. Microgames: An application of microcomputers for training personnel who work with handicapped children. Teacher Education and Special Education, 1981, 4(3), 27-33.

Discusses a potential solution to a problem inherent in teacher training, i.e., transferring knowledge into classroom practice. Practicum experiences are the most effective way to facilitate this transfer. However, they are also the most expensive and time consuming. Computer simulation is offered as an alternative method which is also effective yet less expensive. Simulations are defined as a situation in which the learner must make decisions or take action while interacting with the computer. A five component program has been written to facilitate transfer of training. This system, "Microgames: A Behavior Management Simulation Training System," has been written for in-service and pre-service training of special education personnel. Microgames consists of a classroom behavioral problem simulation, a report summary for feedback, a computer assisted instruction component, a computer guided implementation segment, and a monitor program.

150 Sims, D., VonFeldt, J., Dowaliby, F., Hutchinson, K., & Myers, T. A pilot experiment in computer assisted speechreading instruction utilizing the data analysis video interactive device (DAVID). American Annals of the Deaf, 1979, 124, 618-623.

Presents methodology and results of a research effort to determine if the Data Analysis in a Video Interactive Device (DAVID) system was equal to current drill methodologies for improving communication skills of the deaf. DAVID is a computer assisted instruction (CAI) system developed at the National Technical Institute for the Deaf, Rochester Institute of Technology. Ten deaf students scheduled for advanced speechreading (lipreading) were selected as subjects. Six subjects were assigned to the experimental group to receive one hour a week of DAVID drill in addition to the one hour lecture and group exercises that the control group received. Four different CAI methods of drill were employed with videotapes selected from two curricula developed at NTID. Results show statistically significant gains made in pre-to-posttest assessment of retention and that there were no significant differences between experimental and control groups. Modifications were made to the drilling procedures based on student reactions. Future research will examine effectiveness of interactive vs. noninteractive drill strategies. DAVID will be used to control the amount and type of interaction.

151 Soeffing, M. Where the action is: A look at four special education R and D centers. *Exceptional Children*, 1975, *41*, 419-425.

Describes activities conducted in four special educational Research and Demonstration Centers, one of which developed a computer application as an integral aspect of the project. The Indiana University R-D Center implemented the Computer Assisted Teacher Training System (CATTS) to record behavioral observations entered by trained observers through touch tone button pads. Data consists of verbal, nonverbal, and interactions between a trainer and student teachers of mildly mentally retarded, emotionally disturbed, or learning disabled students. Advantages of this techique include: (1) instantaneous feedback to the teacher; (2) analysis of behavioral duration and sequence; (3) provision of feedback describing likely student behavior if teacher remains in the same pattern; and (4) provision of feedback on the point at which teacher questioning exceeds the student's comprehension.

152 Soforenko, A.Z. Computer client-data programs. *Mental Retardation*, 1974, *12*(1), 40-41.

Reports on a data base information system at the Hartford Regional Center Program in Connecticut. Two major types of data are collected. First, a data base of 91 items is maintained for all developmentally disabled clients. This includes information such as levels of functioning, family data, and services needed. Second, information is maintained on characteristics of foster homes available for placement of clients, e.g., family composition, religion, and select aspects of the physical environment. The primary objective of this data-base system is to maximize the placement success of clients.

153 Souther, H. Handicapped programming. *Compute*, 1982, *4*(5), 170-173.

Provides a program listing and short explanation of a microcomputer program which allows the user to build messages (or computer statements) on the screen and then enter them into the computer. It accepts input from either a numeric keypad or from a joystick The program rims on a Commodore PET microcomputer with the graphics keyboard.

154 Stallard, C.K. Computers and education for exceptional children: Emerging applications. *Exceptional Children*, 1982, *49*(2), 102-104.

Provides an introductory overview for the October 1982 special issue of *Exceptional Children* entitled "Microcomputers' Place in Special Education." The rate of technology change makes keeping up difficult for both experts in the field as well as educators. Exciting new developments for special educators include gains being made in voice recognition abilities of computers, in expressive communication, and in new modes of interacting with computers. The major challenge is for educators to become involved with the development of interactive technology for educational applications.

155 Stern, P., & Rubin, E. Computerized discharge summaries. Archives of Physical Medicine & Rehabilitation, 1979, 60, 25-29.

Presents information on a computerized discharge summary system from the Burke Rehabilitation Center, a 150 bed medical rehabilitation unit in White Plains, New York. The system objectives are to: (1) produce computer generated discharge summaries; (2) file variables contained in the summaries for establishment of a data base of information; (3) generate statistical reports for research purposes; and (4) explore other applications of data base processing in clinical medicine.

156 Stoffel, D. Talking terminals. Byte, 1982, 7(5), 218-227.

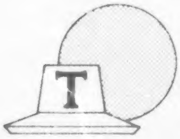
Offers an understanding of human factors involved in selecting a talking terminal and compares current talking terminal products. Talking terminal features include: (1) conventional terminal capabilities; (2) intellegibility and acceptability of speech; (3) provision of a "say again" feature; and (4) ability to present information in a variety of ways suited to user needs and preferences. Current technology provides for one of two design strategies, i.e., built into conventional terminal or self contained accessory module. Each strategy has significant ramifications in terms of speech review and speech parameter control. Other topics examined include a translation algorithm, choosing synthesizers, speech review capabilities, speech parameter control, and future trends.

157 Suppes, P. Computer assisted instruction for deaf students. American Annals of the Deaf, 1971, 116, 500-508.

Discusses the philosophy and structure of a computer assisted instruction (CAI) curriculum in mathematics for deaf and hard of hearing students. It is one of six CAI content areas developed at the Institute for Mathematical Studies in the Social Sciences at Stanford University. Math content is partitioned into strands so that each student interacts with a strand rather than grade level materials. The overall curriculum structure is discussed in depth.

158 Suppes, P., Fletcher, J.D., Zanotti, M., Lorton, P.V., & Searle, B.W. Evaluation of computer assisted instruction in elementary mathematics for hearing-impaired students. Stanford, CA: Stanford University, California Institute for Mathematical Studies in Social Science, 1973. (ERIC Document Reproduction Service No. ED 084 722.)

Reports the results of a study to evaluate the effectiveness of a computer assisted instruction (CAI) math strand program on the acquisition of computation skills for a sample of 385 hearing impaired students from grades two through six. The sample was randomly divided into five groups of 77 students. Each group received a varying number of CAI sessions (i.e., 10, 30, 70, 100, and 130). Integral to the CAI was individualized instruction, acceleration in proficiency areas, drill in deficiency areas, and daily reports of student progress. Pre/post-training data reveal that hearing impaired students achieved gains equal to that expected of normal hearing students. Additionally, it was found that the greater the number of sessions the greater the gain in achievement, however, some gains could alternately be achieved with fewer sessions.



159 Taber, F.M. Microcomputers in special education: Selection and decision making process. Arlington, VA: Council of Exceptional Children, 1982.

This book provides information and guidance for school administrators to assist them in selecting microcomputer systems. Included are chapters on effective use of the microcomputer for instructional and administrative purposes, programming, and special education applications for the microcomputer. Rating forms and questionnaires related to evaluation of software and hardware are also provided.

160 Taber, F.M. The microcomputer: It's applicability to special education. Focus on Exceptional Children, 1981, 14(2), 1-16.

Presents an overview of computers in special education. Topics discussed are educational applications of computers from historical and current perspectives; a description of microcomputers and their uses; considerations in purchasing hardware and software; and various applications and systems currently available for implementing programs for handicapped students. The author states that computer use in education can provide for individualized instruction, nonthreatening presentation of material, innovative teaching process, extension of teacher expertise, and administrative simplification. Conclusions of previous research are presented to show: (1) computers help learners to reach instructional objectives; (2) computers reduce learning time by 20% to 40% as compared to conventional teaching methods; (3) CAI retention is as good or superior to conventional teaching; and (4) students react very positively to good CAI programs and reject poor programs.

161 Thomas, A. Communication devices for the nonvocal disabled. Computer, 1981, 14(1), 25-30.

Discusses the design and results of research in the development of communication devices for nonvocal disabled persons at the Biomedial Engineering Center of Tufts-New England Medical Center. Products incorporate the concepts of personalization, portability, and affordability. The new line of personal communication devices developed are: (1) Tufts Interactive Communicator (TIC); (2) Quick TIC; (3) TACtile TIC; (4) SPEEC; and (5) Line-of-Gaze system. These devices were designed to overcome the problems of speed and ease of use associated with the two major types of communication systems currently available. The line-of-gaze research is being conducted to develop a system of optical scan where corneal reflection is measured using infrared light, eyeglasses frames, and a communication board.

"The area of self-help devices offers perhaps the greatest development challenge because they are used primarily by pupils who were previously excluded from school, the severely retarded and the multiple-handicapped, including the aphonic and physically handicapped." (Blaszczyk, 11)

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162 Thomas, M.A. Educating handicapped students via microcomputer/videodisc technology: A conversation with Ron Thorkildsen. Education and Training of the Mentally Retarded, 1981, 16, 264-269.

Interviews Ron Thorkildsen of Utah State University, who is director of a research project on microcomputer/videodisc and computer assisted instruction for handicapped individuals. He has designed and developed prototype instructional systems for mentally retarded students, severely emotionally disturbed children, mildly handicapped learners, and special educators. The conversation mostly describes the current microcomputer/videodisc project and its future potential for the special education classroom. The three major research questions for the work to date have been: Is the system at least as effective as traditional instruction?; For which population is it most effective?; Is it cost effective?; Results indicate that the system is effective for severely and moderately mentally retarded students with some teacher assistance, and is effective for mildly retarded and learning disabled students with little or no teacher intervention. The most critical piece of advice for teachers and administrators is to become educated to the new computer technology.

163 Thorkildsen, R. Microcomputer/videodisc authoring system for instructional programming. Paper presented at the annual meeting of the American Educational Research Association. New York, NY: March 1982.

Describes a federally funded research effort at Utah State University to develop and field test a system to provide computer assisted instruction (CAI) for mentally handicapped students. Specifically, the system consists of an Apple II microcomputer interfaced with a Pioneer Model 7820 III videodisc player, and a Sony 12" color monitor with a Carroll Manufacturing touch sensitive panel built into its screen. The purpose of the special equipment is to provide CAI to non-readers. Students are prompted by audio from the videodisk player and respond by touching the image of an object on the screen. The first program efforts were made using the CAI language PILOT. Later, the project developed a general purpose authoring system to better meet its needs. The process for developing CAI programs with the system is described. Results of field testing of four of the six existing programs are also provided. Several findings relevant to future design of such programs are presented.

164 Thorkildsen, R.J., & Allard, K.E. Microcomputer/videodisc CAI development considerations. Paper presented at the National Education Computing Conference. Norfolk, VA: June 1980.

Discusses the Microcomputer/Video Disc System designed at Utah State University for use by mentally retarded children and adults. Hardware consists of an MCA 7820 videodisc player, an Apple II microcomputer with disk, a Sony 12" TV monitor, and a Carroll Manufacturing Light interrupt touch panel inserted on the monitor screen. The system provides the student with computer controlled instruction and testing. Responses are made through the touch panel and then evaluated as correct, incorrect, approximately correct, or nonresponse. Each response triggers the appropriate feedback. The four content area programs which have been developed and field tested are: (1) matching; (2) timetelling; (3) recognition of functional words; and (4) identification of coins. Field testing provided information which prompted strategic changes in placement and use of video and audio sequences on the videodisc.

165 Thorkildsen, R.J., Allard, K.E., & Erlacher, J.C. A microcomputer workshop for special educators. The Computing Teacher, 1980-81, 8(2), 57-59.

Presents an overview of a two week workshop on an introduction to microcomputers and their applications for special educators. The workshop was conducted at the Exceptional Child Center at Utah State University in the summer of 1980. The major objective was to provide the teacher with sufficient knowledge about computer applications and software availability to allow them to engage in computer purchasing for classroom use. The nature of the program, which included lectures, readings, and lab experience with the microcomputer is described. Both a formative and summative evaluation of the workshop was conducted and the responses from the participants were most favorable.

166 Thorkildsen, R.J., Bickel, W.K., & Williams, J.G. A microcomputer/videodisc CAI system for the moderately mentally retarded. Journal of Special Education Technology, 1979, 2(3), 45-51.

Describes the Microcomputer/Videodisc system developed at Utah State University to train moderately retarded persons. The system uses an Apple II and is designed to overcome existing limitations of traditional CAI which includes the prerequisite to be able to read and the very limited use of graphics. The system hardware and production is described in detail.

167 Thorkildsen, R.J., & Williams, J.G. A brief review of the current status of computers in special education. Logan, UT: Utah State University, Exceptional Child Center, 1981.

Presents a review of computer assisted instruction (CAI) development efforts in special education. Included is a discussion of the computer as a prosthetic device and the computer as an instructional aid. The authors predict the number of such applications will continue to increase due to falling hardware costs, maturation of CAI software, and increased awareness of computer capabilities. Specific advantages of CAI within special education include: (1) small units of instruction can be presented; (2) repetition is an integral component; (3) immediate feedback can be provided; and (4) instruction is individualized.

168 Torr, D. Computer-supported braille applications. American Annals of the Deaf, 1979, 124, 691-695.

A major problem has been the excessive time required to provide deaf-blind people with the same information which is available to their nonhandicapped peers. As a major recent breakthrough, a computer can now convert the text and print the required grade 2 braille text immediately. Gallaudet College recently obtained a triformation LED 120 braille computer terminal and a computer program from Duxbury Systems, Inc., which converts English text to grade 2 braille. The triformation terminal embosses at 120 characters per second or 1,200 words per minute. This system now permits deaf-blind students at the College to: (1) receive braille textbooks and reference materials in a much more timely fashion; (2) program a major time-sharing computer to carry out course assignments or pursue research interests; and (3) obtain continuous braille copy of campus news which is stored on the computer and continuously distributed by television cable for sighted students; (4) access computer-aided instructional materials available on the computer; and (5) access UPI international news.

169 Trace Software Registry and Listing of Programs Adapted for Rehabilitation Applications with Microcomputers. Trace Research and Development Center for the Severely Communicatively Handicapped, University of Wisconsin, Madison, Wisconsin, 53705.

This registry provides a listing of microcomputer programs which has been written or adapted for use by physically handicapped individuals. Included in the listing is: (1) a brief description of each program; (2) the computer(s) it will run on; (3) the memory requirements; (4) the programming language; and (5) the necessary peripherals. A $15 fee covers the cost of the first 100 entries. In addition to this registry, the Trace Center collects and disseminates documents on the application of technology in meeting the communication needs of the nonvocal and other handicapped persons, publishes a variety of materials on technology and communication problems, and develops input and output computer devices to meet the specific needs of disabled persons.

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170 Use of Computers in Regular and Special Education Teacher Education (No. 509). CEC/ERIC Computer Search Reprints, CEC Publications Sales, 1920 Association Drive, Reston, Virginia, 22091.

This computer search reprint consists of 100 bibliographic abstracts on the above topic. The literature is derived from both the Exceptional Child Education Resources (ECER) and Educational Resources Information Center (ERIC) data bases. The price of this computer search reprint, No. 509, is $8.50 for Council for Exceptional Children (CEC) members and $10 for all others.

V

171 Vanderheiden, G. Practical application of microcomputers to aid the handicapped. Computer, 1981, 14(1), 54-61.

Discusses ten areas of microcomputer applications to aid handicapped persons: (1) sensory enhancement or translation; (2) manipulation control; (3) information amplification for the motion impaired; (4) special control interfaces to other devices; (5) recreation and development aids; (6) education; (7) communication; (8) cognitive and language processing assistance; (9) information/resource management; and (10) security/monitoring systems. In addition, many barriers to the extensive use of microcomputers in rehabilitation are summarized, such as stationary design, limited durability, slow access speed of low cost systems, limited operating systems, and the lack of multilevel program execution and multitask processing. Computer programs can be written to perform all the functions that disabled individuals are unable to do, however, current programming technology does not inexpensively or easily accommodate this.

172 Vanderhieden, G. Computers can play a dual ~~role~~ for disabled individuals. Byte, 1982, 7(9), 136-162.

Provides an overview of some of the many areas in which microcomputers can serve the needs of disabled individuals and discusses a few major concepts important in developing successful software. The purpose of the paper is to stimulate new ideas, approaches, and applications for persons designing programs for the disabled. A major point made is that microcomputers must do more than just perform special functions for handicapped persons, but also allow them to use all the standard powers used by non-disabled users, e.g., text editors, spreadsheet programs, educational software. The special functions which can be aided by use of microcomputers which are discussed include: (1) sensory enhancement; (2) manipulators/controllers; (3) information amplification for motor impaired individuals; (4) special control interfaces to other devices; (5) recreation and development aids; (6) educational aids; (7) information resource/management; (8) security/monitoring systems; and (9) cognitive and language-processing assistance. To allow use of standard software programs it is necessary to make transparent modifications, that is modifications that cannot be detected by the programs. A simple example of such a change is a weight on a hinge that can be tipped to hold down the shift key. Two other important future concepts are multilevel and multitasking program execution. Multilevel refers to stacking of programs to allow input to finally reach the desired end program. Multitasking means several programs are running at once and can be exited and re-entered.

173 Vitello, S. J., & Bruce, P. Computer-assisted instructional programs to facilitate mathematical learning among the handicapped. Journal of Computer-Based Instruction, 1977, 4(2), 26-29.

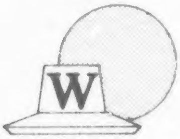
Describes two drill and practice computer assisted instruction programs developed for teaching computation skills and facilitating development of quantitative concepts (shape/size discrimination) to mentally retarded students. The computational program is based on a presentation format designed to increase the probability of success in the initial stages of learning. The program systematically and sequentially moves the student from a two option multiple choice format to one in which they must supply the answer with no options provided. Necessary equipment includes a computer keyboard, a light pen, a computer terminal, an image projector, and an audio unit. The quantitative concept program consists of five segments designed to teach size/shape discrimination of circles, triangles, squares, and rectangles. Review of prior concepts and tests of current level of discrimination are built into the program as are features for expanding and enhancing conceptualization.

174 Vitello, S.J., Sedlak, R., & Peck, A. *Follow up evaluation of a computer assisted instruction course on the early identification of handicapped children.* Washington, D.C.: Bureau of Education for the Handicapped, 1972. (ERIC Document Reproduction Service No. ED 077 868.)

Presents a follow-up evaluation to determine the perceptions of 38 regular classroom teachers toward a computer assisted instruction (CAI) college level course on early identification of handicapping conditions in school children. Computer hardware was housed on a mobile van for easy transport to teachers located in remote areas. A sixteen item yes/no questionnaire was administered to teachers one year after course completion. The questionnaire was constructed to assess: (1) reaction toward the course; (2) reaction toward CAI; and (3) self-reported ability to identify handicapping conditions. Results indicate positive feelings towards both the CAI and course content. Furthermore, there was a preference for CAI over traditional instruction. Finally, it was reported that the teachers' ability to identify handicapped children had increased.

175 VonFeldt, J.R. A national survey of the use of computer assisted instruction in schools for the deaf. *Journal of Educational Technology Systems*, 1978-79, *7*(1), 29-38.

Reports the results of a survey conducted to describe the use of computers in schools for the deaf. A survey questionnaire, consisting of 11 items, was developed and distributed to 237 schools for the deaf throughout the nation with a return rate of 46% (N = 111). Of that number, 34 schools reported use of computer mainly for instructional purposes. The most frequent instructional use was provision of drill and practice in math, language arts, and reading. Problems which were reported consisted of: (1) lack of facilities; (2) diminished ability to develop own courseware; (3) lack of teacher training in computer use; (4) lack of support for courseware development; and (5) lack of access to lessons developed at other schools.



176 Watkins, M.W., & Webb, C. Computer assisted instruction with learning disabled students. *Educational Computer Magazine*, 1981, *1*(3), 24-27.

Discusses a small classroom experiment using computer assisted instruction (CAI) with 28 learning disabled students in grades 1 to 6.

A control group received the traditional special educational math curriculum, while the experimental group participated in a math CAI program. Results indicate that the CAI group received greater post-test scores than the control group. Several CAI delivery models are discussed as well as criteria for CAI design.

177 Watson, P.G. Utilization of the computer with deaf learners. Educational Technology, 1978, 18(4), 47-49.

Reviews computer applications in relation to the special learning problems of deaf students. The two application categories which emerge from the review are computers as a communication aid and computers as an educational aid. In communication, computers have been used in compensatory fashion to provide an effective interface with education. Specifically, written material can be converted to synthetic speech, tactile vibrations, or braille (output on paper tape). Educational computer programs have been written to teach math, language arts, signing, English, and reading. Programs have also been developed to assist in the administrative components of teaching, and data banks of information and materials identification have been computer stored for easy access and retrieval.

> "*. . . the advent of low-cost microcomputer and related technologies has provided the potential for increased effectiveness and efficiency in the delivery of these special education services.*" (Bennett, 12)

178 Watson, P. The utilization of the computer with the hearing impaired and the handicapped. American Annals of the Deaf, 1979, 124(5), 670-680.

Reviews past, current, and future applications of computers to learning and communication problems of the handicapped, with particular emphasis directed to the deaf. As for the instructional/educational uses of the computer with the deaf, the author highlights some of the major activities going on around the country, e.g., National Institute for the Deaf, Gallaudet College, California School for the Deaf at Berkeley, and California School for the Deaf at Riverside. Substantial attention is also devoted to computer assisted communication, in which computer technology is used to compensate for a specific sensory or motor handicapping condition, and thereby providing the handicapped learner with an effective interface with the environment. As for the future, the development of optical videodiscs systems is considered to be the next major technological breakthrough and one which should prove to have tremendous impact on both the handicapped and nonhandicapped populations. In summary, Dr. Watson purports that the relevant question today is not whether computer technology will be used to help solve instructional and communication problems of the handicapped, but rather how it will be used and how it will effect the education of the handicapped in the next decade.

179 Weir, S. Logo and the exceptional child. Microcomputing, 1981, 5(9), 76-83.

The programming language Logo provides a versatile tool for diagnostic, instructional, and remedial use with children who have special educational needs. Three case studies are used to expose the opportunities for enhanced learning for learning disabled, cerebral palsied, and autistic children. Students with reading problems are increasingly being discovered to be spatially gifted. The drawing capabilities of Logo gives these students an area in which to be successful. Such programming activity also increases procedural thinking as well as teaching many mathematical properties. Microcomputers can revolutionize the lives of physically handicapped (e.g., cerebral palsied) children by allowing them to communicate independently of other people. Thus, they can express and develop their intelligence. A special benefit of working with Logo for autistic children is an increase in active learning and social interaction. Computers in general, and Logo specifically, can raise motivation levels of students and teachers alike.

180 Weir, S., Russell, S.J., & Valente, J.A. LOGO: An approach to educating disabled children. Byte, 1982, 7(9), 342-360.

Five case histories serve as examples of how the LOGO programming language has been used to put students with severe educational disabilities in charge of their own learning. LOGO takes the focus away from coping with what the student cannot do and gives attention to developing special gifts and talents the student possesses. Its flexibility allows teachers to tailor learning situations to each child. LOGO is a good language for quickly becoming familiar with programming, yet it offers a powerful set of graphics, text editing, and list processing capabilities. Other topics discussed are the use of LOGO to: (1) gain knowledge about knowledge (meta-knowledge); (2) find out about spatial relationships by manipulating models of objects on the screen; and (3) provide problem solving experiences for students who have always been dependent upon other people.

181 Weir, S., & Watt, D. LOGO: A computer environment for learning-disabled students. The Computing Teacher, 1980-81, 8(5), 11-19.

Describes a project to provide innovative computer-based learning for learning disabled (LD) students in grades 5-8. The computer language LOGO will be used to teach programming skills and problem solving abilities. A major goal is to help teachers of LD students to develop the skill and confidence to implement computer work in individual education plans. The article provides case histories of two LD students who benefited from LOGO use, and their teacher's perspective of the LOGO learning environment. Plans for training and support of teachers include pre-training, providing important support materials, direct support from a resource teacher, project meetings, and development of a support network within the school and the community.

182 West, T.L. Individualized teacher training for mainstreaming using a computer assisted goal setting procedure. Paper presented at the 57th Annual International Council for Exceptional Children Convention, Dallas, Texas, April 22-27, 1979. (ERIC Document Reproduction Service No. ED 171 005.)

Discussed is an instructional procedure whereby students training to be special education teachers interact with a computer to learn how to prioritize training goals for handicapped students. The computer based module is referred to as the Individualized Training Plans - Goal Setting Procedure and includes four phases: (1) relevance of each goal area; (2) performance expectations and expectations for change; (3) prioritization of training goals and budgeting of available training time; and (4) a summary. Students who participated in this computer-based instruction were satisfied with the results of this mode of teaching.

183 West Virginia Rehabilitation Research and Training Center. A field based microcomputer-assisted vocational rehabilitation counseling system. Annual Report. Dunbar, WV: West Virginia University, 1980.

Describes a project designed to develop, demonstrate, implement, and evaluate a microcomputer based software vocational rehabilitation counseling system. Project development procedures were to: (1) procure a hardware system; (2) design a rehabilitation software package to generate client profiles and produce time and cost of services estimates, probability estimates associated with different rehabilitation outcomes, and weekly or monthly caseload statistics; (3) conduct a systems analysis; (4) evaluate the system and modify it accordingly; (5) implement the system with ten inservice VR counselors; and (6) evaluate the system by comparing the results from the ten counselors using the system with ten VR counselors not using the system.

184 Whitney, R.A., & Hofmeister, A.M. MONITOR: A computer based management information system for special education. Logan, UT: Utah State University, Exceptional Child Center, n.d.

Details pertinent aspects of MONITOR, a microcomputer operated management information system for special education developed at Utah State University. MONITOR was designed to provide special education personnel with the information to monitor and document P.L. 94-142 compliance activities. The menu driven system was developed to be implemented easily by teachers with no previous computer training. It enables users to perform three functions, i.e., teachers or administrators can create student records, access student records, and generate reports. Specifically, MONITOR can: (1) assign and monitor timelines for all educational services to be delivered to special students; (2) provide timeline summaries of educational services delivered and yet to be delivered; (3) provide program information on the ability of specific schools to delivery educational services within established timelines; and (4) provide basic student records to program administrators.

185 Wilson, K. Managing the administrative morass of special needs. *Classroom Computer News*, 1981, *1*(4), 8-9.

Discusses the numerous administrative problems created by the passage of P.L. 94-142. Implementation of microcomputers into classroom instruction is presented as a way to effectively ease the problems. Computer data bases can be designed and stored so that banks of information are readily available on: (1) educational goals and objectives; (2) methodological advances; (3) instructional methods which interact with specific goals; and (4) recommended materials and their availability or location. Use of such data banks can facilitate better teacher planning and parent input into student programs.

186 Wilson, M.S., & Fox, B. Computer-administered bilingual language assessment and intervention. *Exceptional Children*, 1982, *49*, 145-149.

A critical need in both special education and bilingual education is for innovative and effective assessment and intervention materials for language disorders. A description of a prototype microcomputer system which has been used to both test and train language impaired children is provided. The system includes an Apple II+ microcomputer, an Apple graphics tablet, a Mountain Computer "SuperTalker," a color monitor, two floppy disc drives, and a line printer with graphics capabilities. The SuperTalker uses a speech digitization method which allows the computerization of different languages. Both a prototype assessment instrument and a prototype instructional program were developed and field tested. The assessment courseware evaluates performance on three prepositions: *in*, *on*, and *under*. Three pictures are shown of an object; one of it *in* something, one of it *on* something, and one of it *under* something. The SuperTalker asks the student to point at one of three pictures by using one of three prepositions, e.g., "show me the pencil *in* the holder." Results are mixed but have convinced the authors that courseware for bilingual comprehension can be successfully written.

187 Winters, J.J., Hoats, D.L., & East, M.J. The instructional use of CAI in the education of the mentally retarded. Paper presented at the World Congress on Future Special Education. Stirling, Scotland: June-July 1978. (ERIC Document Reproduction Service No. ED 157 333.)

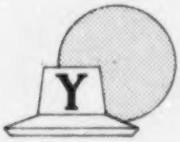
This presentation to the World Congress on Future Special Education summarizes the literature on computer assisted instruction (CAI) with the mentally retarded in the United States and Canada. Research has revealed that for the slow learner CAI is superior to traditional instructional methods when standardized tests are used as measurements of learning. The information is learned in less time and is more cost-effective. Possible reasons for this are the patience of the computer, the structured manner of the computer presentation, the provision of immediate feedback, and individualization of instruction. However, CAI programs are still scarce in special education classes because of prohibitive hardware costs, unavailability of quality software, and teacher and administrator resistance.

188 Withrow, M. Computer animation and language instruction. American Annals of the Deaf, 1978, 123, 723-725.

Discusses how computer graphics with videotape might provide early educational opportunities to deaf students to assist them in developing language skills associated with common symbols. The Ohio State University Research Foundation has developed ANIMA II, a system combining three-dimensional computer graphics with a videorecorder. The purpose of the system is to allow educators to design and program their own language learning packages for the deaf.

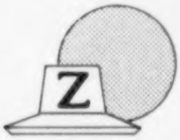
189 Withrow, M. Illustrating language through computer generated animation. American Annals of the Deaf, 1979, 124, 549-552.

Discusses the potential of computer graphics to enhance language acquisition and reading and writing skills. The author worked with the Computer Graphics Research Group at Ohio State University to design and develop learning packages via videocasettes. A unique format of three-dimensional computer animation associates visual and auditory images with the acquisition of language principles. With the advent of microcomputer controlled videotape and videodisc, the possibilities for visual displays are greatly enhanced.



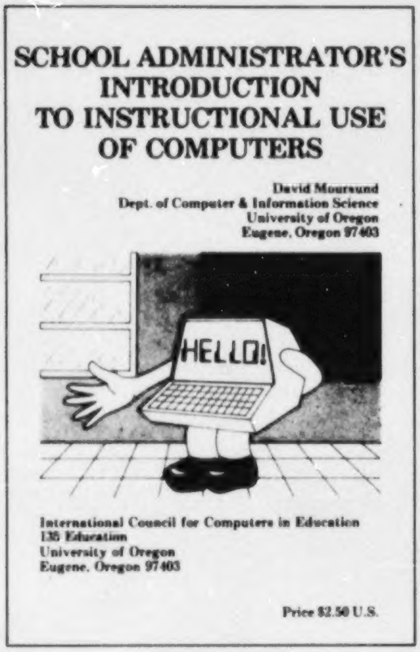
190 Young, M., & Ashcroft, S.C. Applications of paperless braille records and microcomputers for blind youth. Counterpoint, 2(1).

Summarizes recent developments in the application of microcomputers for the blind. Access to microcomputers is being achieved for this population through the use of Paperless Braille Recorders (PBR), Optacon (Optical-to-tactile converter), and synthetic speech output devices to allow tactual and auditory interaction. Additionally, enlarged terminal print is being used to facilitate interaction for visually impaired persons. A special feature of PBR is the capability for two individuals (one blind and one sighted) to interact simultaneously, the blind person using the PBR while the sighted person uses the standard keyboard and terminal display.



191 Zawolkow, G. Computer education for the deaf in the San Francisco Bay Area. Proceedings of the Association of Computer Based Instructional Systems, 1979, 2, 420-421.

Describes a computer assisted instruction (CAI) system developed at the California School for the Deaf (CSD). The system consists of 12 hardcopy terminals connected via telephone lines to a minicomputer at the University of California, Berkeley. A computer laboratory proctor is responsible for machine maintenance, scheduling, inputting authored programs, and providing assistance to students and teachers. Twelve teacher authoring programs are available for use. Project limitations include reduced ability to disseminate materials developed in-house, machine inaccessibility to low functioning students, and travel time imposed by the remote locations of the computer lab. Supplemental funding has been obtained in order to overcome these limitations. This funding will establish CSD as a regional center for materials development and dissemination, and allow CSD to purchase an Apple II system.



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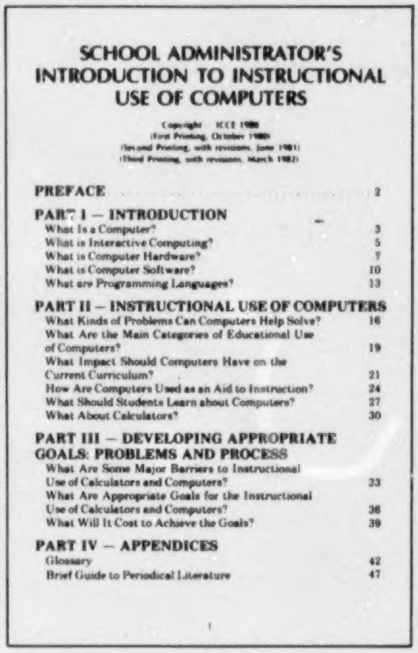

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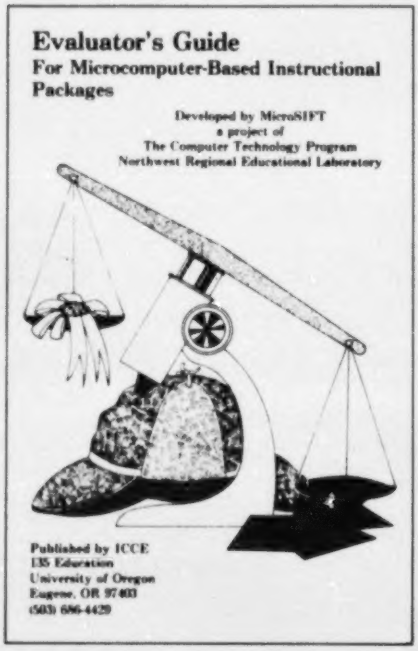

Evaluator's Guide
For Microcomputer-Based Instructional Packages

Developed by MicroSIFT
a project of
The Computer Technology Program
Northwest Regional Educational Laboratory

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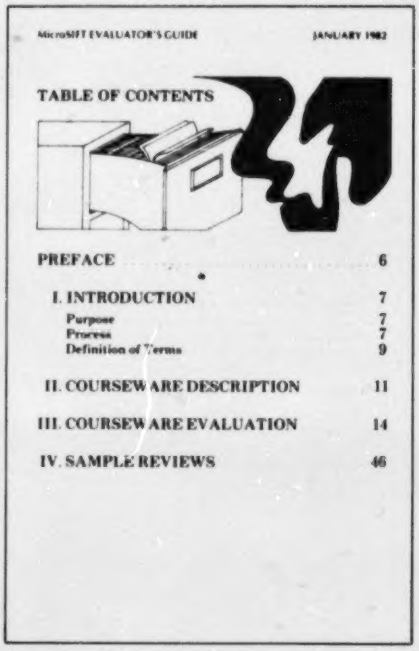

MicroSIFT EVALUATOR'S GUIDE JANUARY 1982

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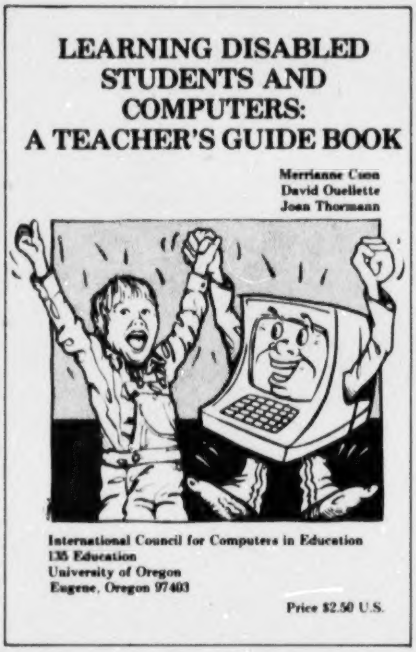

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ABSTRACT

This 48-page illustrated booklet was written to de-mystify microcomputing for classroom and resource room teachers who are involved in meeting the needs of those children legally identified as learning disabled. It introduces three major approaches to educational computing, surveys the most common concerns and misconceptions in using computers with L.D. students and contains brief sections on software, hardware and the future of computers in the education of learning disabled students. The resource section contains a glossary and a reference to publishers, books and organizations involved with computers and special education.

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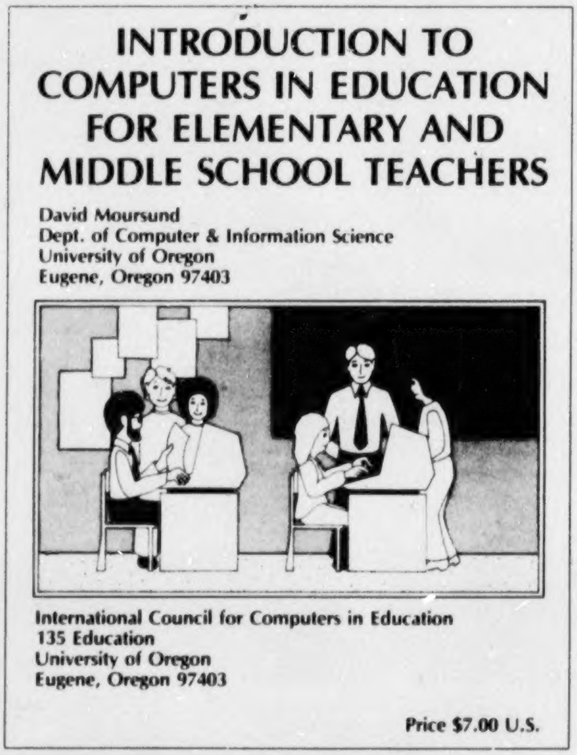

INTRODUCTION TO COMPUTERS IN EDUCATION FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS

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INTRODUCTION TO COMPUTERS IN EDUCATION FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS by David Moursund is an 8½x11, 96-page book designed for self-instruction or for a formal inservice or preservice course for teachers. The book is suitable for teachers at all levels and is often used as a text for elementary or secondary school teachers. It contains an in-depth treatment of teaching about and teaching using computers at the elementary and middle school levels. The book includes over 75 activities that can be used at this educational level.

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